RESULTS SUMMARY REPORT

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: Isotec
Project: PB&W/FORMOSA PLASTICS - 901132
Lab Case No.: E12-09628

Lab ID:	09628-001			09628-002			09628-003			09628-004		
Client ID:	S-A/CONTROL			S-A/A AQUEOUS			S-A/B AQUEOUS			S-A/C AQUEOUS		
Client ID Cont.:	AQUEOUS SAMPLE			SAMPLE			SAMPLE			SAMPLE		
Matrix:	Aqueous			Aqueous			Aqueous			Aqueous		
Sampled Date	9/21/12			9/21/12			9/21/12			9/21/12		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	*(ug/L-ppb)*			*(ug/L-ppb)*			*(ug/L-ppb)*			*(ug/L-ppb)*		
Vinyl chloride	ND		1650	3010	J	1650	3700		165	396		1.65
tert-Butyl alcohol (TBA)	ND		4150	ND		4150	ND		415	ND		4.15
trans-1,2-Dichloroethene	ND		1850	ND		1850	260	J	185	9.24		1.85
1,1-Dichloroethane	2720	J	1050	1910	J	1050	539		105	3.42	J	1.05
cis-1,2-Dichloroethene	ND		1700	ND		1700	185	J	170	11.2		1.70
Chloroform	41600		1200	22300		1200	1710		120	ND		1.20
1,2-Dichloroethane (EDC)	652000		2000	497000		2000	86100		200	243		2.00
Benzene	ND		1050	ND		1050	ND		105	1.35	J	1.05
Trichloroethene	ND		1400	ND		1400	211	J	140	2.14	J	1.40
1,1,2-Trichloroethane	4370	J	1050	ND		1050	ND		105	ND		1.05
Tetrachloroethene	ND		1100	ND		1100	183	J	110	1.51	J	1.10
TOTAL VO's:	701000	J		524000	J		92900	J		668	J	

Lab ID:	09628-005			09628-006			09628-007			09628-008		
Client ID:	S-H/CONTROL			S-H/A AQUEOUS			S-H/B AQUEOUS			S-H/C AQUEOUS		
Client ID Cont.:	AQUEOUS SAMPLE			SAMPLE			SAMPLE					
Matrix:	Aqueous			Aqueous			Aqueous			Aqueous		
Sampled Date	9/21/12			9/21/12			9/21/12			9/21/12		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	*(ug/L-ppb)*			*(ug/L-ppb)*			*(ug/L-ppb)*			*(ug/L-ppb)*		
Chloromethane	ND		1800	ND		1800	1150		36.0	571		36.0
Methylene chloride	ND		9900	ND		9900	9420		198	4490		198
tert-Butyl alcohol (TBA)	ND		4150	ND		4150	ND		83.0	ND		83.0
1,1-Dichloroethane	3280	J	1050	2800	J	1050	211		21.0	64.8	J	21.0
Chloroform	50900		1200	38100		1200	15400		24.0	8210		24.0
1,1,1-Trichloroethane	ND		1650	ND		1650	143		33.0	107		33.0
Carbon tetrachloride	ND		1350	ND		1350	133		27.0	109		27.0
1,2-Dichloroethane (EDC)	746000		2000	568000		2000	2750		40.0	200		40.0
Trichloroethene	1680	J	1400	ND		1400	ND		28.0	ND		28.0
Bromodichloromethane	ND		1650	ND		1650	168		33.0	89.1	J	33.0
1,1,2-Trichloroethane	4860	J	1050	3340	J	1050	8310		21.0	2650		21.0
Tetrachloroethene	ND		1100	ND		1100	28.1	J	22.0	ND		22.0
1,1,2,2-Tetrachloroethane	ND		1650	ND		1650	659		33.0	410		33.0
TOTAL VO's:	807000	J		612000	J		38400	J		16900	J	

ND = Analyzed for but Not Detected at the MDL
J = The concentration was detected at a value below the RL and above the MDL
All qualifiers on individual Volatiles & Semivolatiles are carried down through summation.

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT
Client: Isotec
Project: PB&W/FORMOSA PLASTICS - 901132
Lab Case No.: E12-09628

Lab ID:	09628-009			09628-010			09628-011			09628-012		
Client ID:	S-A/CONTROL			S-A/A SOIL			S-A/B SOIL			S-A/C SOIL		
Client ID Cont.:	SOIL SAMPLE			SAMPLE			SAMPLE			SAMPLE		
Matrix:	Soil			Soil			Soil			Soil		
Sampled Date	9/21/12			9/21/12			9/21/12			9/21/12		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	*(mg/Kg-ppm)*			*(mg/Kg-ppm)*			*(mg/Kg-ppm)*			*(mg/Kg-ppm)*		
Vinyl chloride	ND		0.403	ND		0.412	0.551		0.082	ND		0.080
tert-Butyl alcohol (TBA)	ND		0.446	ND		0.456	ND		0.091	ND		0.089
1,1-Dichloroethane	0.416	J	0.250	0.469	J	0.256	0.076	J	0.051	ND		0.050
Chloroform	5.41		0.226	4.54		0.231	0.201		0.046	ND		0.045
1,2-Dichloroethane (EDC)	116		0.147	124		0.150	12.8		0.030	0.063	J	0.029
1,1,2-Trichloroethane	0.697		0.165	ND		0.169	ND		0.034	ND		0.033
TOTAL VO's:	123	J		129	J		13.6	J		0.063	J	

Lab ID:	09628-013			09628-014			09628-015			09628-016		
Client ID:	S-H/CONTROL			S-H/A SOIL			S-H/B SOIL			S-H/C SOIL		
Client ID Cont.:	SOIL SAMPLE			SAMPLE			SAMPLE			S-H/C SOIL SAMPLE		
Matrix:	Soil			Soil			Soil			Soil		
Sampled Date	9/21/12			9/21/12			9/21/12			9/21/12		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (Units)	*(mg/Kg-ppm)*			*(mg/Kg-ppm)*			*(mg/Kg-ppm)*			*(mg/Kg-ppm)*		
Methylene chloride	ND		1.21	ND		1.20	0.549		0.238	0.372		0.243
tert-Butyl alcohol (TBA)	ND		0.445	ND		0.444	ND		0.088	ND		0.090
Chloroform	2.75		0.225	2.90		0.225	0.553		0.045	0.409		0.045
1,2-Dichloroethane (EDC)	74.0		0.146	75.0		0.146	0.487		0.029	0.053	J	0.030
1,1,2-Trichloroethane	0.491	J	0.164	0.503	J	0.164	0.585		0.032	0.176		0.033
TOTAL VO's:	77.2	J		78.4	J		2.17			1.01	J	

ND = Analyzed for but Not Detected at the MDL
J = The concentration was detected at a value below the RL and above the MDL
All qualifiers on individual Volatiles & Semivolatiles are carried down through summation.

ANALYTICAL RESULTS

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-001
Client ID: S-A/CONTROL_AQ
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3756.D

GC/MS Column: DB-624
Sample wt/vol: 0.001ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 5000
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		5000	1800
Vinyl chloride	ND		5000	1650
Bromomethane	ND		5000	2000
Chloroethane	ND		5000	2000
Trichlorofluoromethane	ND		5000	1700
Acrolein	ND		100000	12900
1,1-Dichloroethene	ND		5000	1550
Methylene chloride	ND		10000	9900
Acrylonitrile	ND		100000	8300
tert-Butyl alcohol (TBA)	ND		10000	4150
trans-1,2-Dichloroethene	ND		5000	1850
Methyl tert-butyl ether (MTBE)	ND		5000	1500
1,1-Dichloroethane	2720	J	5000	1050
cis-1,2-Dichloroethene	ND		5000	1700
Chloroform	41600		5000	1200
1,1,1-Trichloroethane	ND		5000	1650
Carbon tetrachloride	ND		5000	1350
1,2-Dichloroethane (EDC)	652000		5000	2000
Benzene	ND		5000	1050
Trichloroethene	ND		5000	1400
1,2-Dichloropropane	ND		5000	1450
Bromodichloromethane	ND		5000	1650
2-Chloroethyl vinyl ether	ND		5000	1150
cis-1,3-Dichloropropene	ND		5000	1100
Toluene	ND		5000	1150
trans-1,3-Dichloropropene	ND		5000	1150
1,1,2-Trichloroethane	4370	J	5000	1050
Tetrachloroethene	ND		5000	1100
Dibromochloromethane	ND		5000	1250
Chlorobenzene	ND		5000	1100
Ethylbenzene	ND		5000	1450
Total Xylenes	ND		10000	3400
Bromoform	ND		5000	1300
1,1,2,2-Tetrachloroethane	ND		5000	1650
1,3-Dichlorobenzene	ND		5000	1250
1,4-Dichlorobenzene	ND		5000	1100
1,2-Dichlorobenzene	ND		5000	1200
Total Target Compounds (37):	701000	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-002
Client ID: S-A/A_AQUEOUS_
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3757.D

GC/MS Column: DB-624
Sample wt/vol: 0.001ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 5000
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		5000	1800
Vinyl chloride	3010	J	5000	1650
Bromomethane	ND		5000	2000
Chloroethane	ND		5000	2000
Trichlorofluoromethane	ND		5000	1700
Acrolein	ND		100000	12900
1,1-Dichloroethene	ND		5000	1550
Methylene chloride	ND		10000	9900
Acrylonitrile	ND		100000	8300
tert-Butyl alcohol (TBA)	ND		10000	4150
trans-1,2-Dichloroethene	ND		5000	1850
Methyl tert-butyl ether (MTBE)	ND		5000	1500
1,1-Dichloroethane	1910	J	5000	1050
cis-1,2-Dichloroethene	ND		5000	1700
Chloroform	22300		5000	1200
1,1,1-Trichloroethane	ND		5000	1650
Carbon tetrachloride	ND		5000	1350
1,2-Dichloroethane (EDC)	497000		5000	2000
Benzene	ND		5000	1050
Trichloroethene	ND		5000	1400
1,2-Dichloropropane	ND		5000	1450
Bromodichloromethane	ND		5000	1650
2-Chloroethyl vinyl ether	ND		5000	1150
cis-1,3-Dichloropropene	ND		5000	1100
Toluene	ND		5000	1150
trans-1,3-Dichloropropene	ND		5000	1150
1,1,2-Trichloroethane	ND		5000	1050
Tetrachloroethene	ND		5000	1100
Dibromochloromethane	ND		5000	1250
Chlorobenzene	ND		5000	1100
Ethylbenzene	ND		5000	1450
Total Xylenes	ND		10000	3400
Bromoform	ND		5000	1300
1,1,2,2-Tetrachloroethane	ND		5000	1650
1,3-Dichlorobenzene	ND		5000	1250
1,4-Dichlorobenzene	ND		5000	1100
1,2-Dichlorobenzene	ND		5000	1200
Total Target Compounds (37):	524000	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-003
Client ID: S-A/B_AQUEOUS_
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3758.D

GC/MS Column: DB-624
Sample wt/vol: 0.01ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 500
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		500	180
Vinyl chloride	3700		500	165
Bromomethane	ND		500	200
Chloroethane	ND		500	200
Trichlorofluoromethane	ND		500	170
Acrolein	ND		10000	1290
1,1-Dichloroethene	ND		500	155
Methylene chloride	ND		1000	990
Acrylonitrile	ND		10000	830
tert-Butyl alcohol (TBA)	ND		1000	415
trans-1,2-Dichloroethene	260	J	500	185
Methyl tert-butyl ether (MTBE)	ND		500	150
1,1-Dichloroethane	539		500	105
cis-1,2-Dichloroethene	185	J	500	170
Chloroform	1710		500	120
1,1,1-Trichloroethane	ND		500	165
Carbon tetrachloride	ND		500	135
1,2-Dichloroethane (EDC)	86100		500	200
Benzene	ND		500	105
Trichloroethene	211	J	500	140
1,2-Dichloropropane	ND		500	145
Bromodichloromethane	ND		500	165
2-Chloroethyl vinyl ether	ND		500	115
cis-1,3-Dichloropropene	ND		500	110
Toluene	ND		500	115
trans-1,3-Dichloropropene	ND		500	115
1,1,2-Trichloroethane	ND		500	105
Tetrachloroethene	183	J	500	110
Dibromochloromethane	ND		500	125
Chlorobenzene	ND		500	110
Ethylbenzene	ND		500	145
Total Xylenes	ND		1000	340
Bromoform	ND		500	130
1,1,2,2-Tetrachloroethane	ND		500	165
1,3-Dichlorobenzene	ND		500	125
1,4-Dichlorobenzene	ND		500	110
1,2-Dichlorobenzene	ND		500	120
Total Target Compounds (37):	92900	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-004
Client ID: S-A/C_AQUEOUS_
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3759.D

GC/MS Column: DB-624
Sample wt/vol: 1ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 5
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		5.00	1.80
Vinyl chloride	396		5.00	1.65
Bromomethane	ND		5.00	2.00
Chloroethane	ND		5.00	2.00
Trichlorofluoromethane	ND		5.00	1.70
Acrolein	ND		100	12.9
1,1-Dichloroethene	ND		5.00	1.55
Methylene chloride	ND		10.0	9.90
Acrylonitrile	ND		100	8.30
tert-Butyl alcohol (TBA)	ND		10.0	4.15
trans-1,2-Dichloroethene	9.24		5.00	1.85
Methyl tert-butyl ether (MTBE)	ND		5.00	1.50
1,1-Dichloroethane	3.42	J	5.00	1.05
cis-1,2-Dichloroethene	11.2		5.00	1.70
Chloroform	ND		5.00	1.20
1,1,1-Trichloroethane	ND		5.00	1.65
Carbon tetrachloride	ND		5.00	1.35
1,2-Dichloroethane (EDC)	243		5.00	2.00
Benzene	1.35	J	5.00	1.05
Trichloroethene	2.14	J	5.00	1.40
1,2-Dichloropropane	ND		5.00	1.45
Bromodichloromethane	ND		5.00	1.65
2-Chloroethyl vinyl ether	ND		5.00	1.15
cis-1,3-Dichloropropene	ND		5.00	1.10
Toluene	ND		5.00	1.15
trans-1,3-Dichloropropene	ND		5.00	1.15
1,1,2-Trichloroethane	ND		5.00	1.05
Tetrachloroethene	1.51	J	5.00	1.10
Dibromochloromethane	ND		5.00	1.25
Chlorobenzene	ND		5.00	1.10
Ethylbenzene	ND		5.00	1.45
Total Xylenes	ND		10.0	3.40
Bromoform	ND		5.00	1.30
1,1,2,2-Tetrachloroethane	ND		5.00	1.65
1,3-Dichlorobenzene	ND		5.00	1.25
1,4-Dichlorobenzene	ND		5.00	1.10
1,2-Dichlorobenzene	ND		5.00	1.20
Total Target Compounds (37):	668	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-005
Client ID: S-H/CONTROL_AQ
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3755.D

GC/MS Column: DB-624
Sample wt/vol: 0.001ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 5000
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		5000	1800
Vinyl chloride	ND		5000	1650
Bromomethane	ND		5000	2000
Chloroethane	ND		5000	2000
Trichlorofluoromethane	ND		5000	1700
Acrolein	ND		100000	12900
1,1-Dichloroethene	ND		5000	1550
Methylene chloride	ND		10000	9900
Acrylonitrile	ND		100000	8300
tert-Butyl alcohol (TBA)	ND		10000	4150
trans-1,2-Dichloroethene	ND		5000	1850
Methyl tert-butyl ether (MTBE)	ND		5000	1500
1,1-Dichloroethane	3280	J	5000	1050
cis-1,2-Dichloroethene	ND		5000	1700
Chloroform	50900		5000	1200
1,1,1-Trichloroethane	ND		5000	1650
Carbon tetrachloride	ND		5000	1350
1,2-Dichloroethane (EDC)	746000		5000	2000
Benzene	ND		5000	1050
Trichloroethene	1680	J	5000	1400
1,2-Dichloropropane	ND		5000	1450
Bromodichloromethane	ND		5000	1650
2-Chloroethyl vinyl ether	ND		5000	1150
cis-1,3-Dichloropropene	ND		5000	1100
Toluene	ND		5000	1150
trans-1,3-Dichloropropene	ND		5000	1150
1,1,2-Trichloroethane	4860	J	5000	1050
Tetrachloroethene	ND		5000	1100
Dibromochloromethane	ND		5000	1250
Chlorobenzene	ND		5000	1100
Ethylbenzene	ND		5000	1450
Total Xylenes	ND		10000	3400
Bromoform	ND		5000	1300
1,1,2,2-Tetrachloroethane	ND		5000	1650
1,3-Dichlorobenzene	ND		5000	1250
1,4-Dichlorobenzene	ND		5000	1100
1,2-Dichlorobenzene	ND		5000	1200
Total Target Compounds (37):	807000	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-006
Client ID: S-H/A_AQUEOUS_
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3760.D

GC/MS Column: DB-624
Sample wt/vol: 0.001ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 5000
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		5000	1800
Vinyl chloride	ND		5000	1650
Bromomethane	ND		5000	2000
Chloroethane	ND		5000	2000
Trichlorofluoromethane	ND		5000	1700
Acrolein	ND		100000	12900
1,1-Dichloroethene	ND		5000	1550
Methylene chloride	ND		10000	9900
Acrylonitrile	ND		100000	8300
tert-Butyl alcohol (TBA)	ND		10000	4150
trans-1,2-Dichloroethene	ND		5000	1850
Methyl tert-butyl ether (MTBE)	ND		5000	1500
1,1-Dichloroethane	2800	J	5000	1050
cis-1,2-Dichloroethene	ND		5000	1700
Chloroform	38100		5000	1200
1,1,1-Trichloroethane	ND		5000	1650
Carbon tetrachloride	ND		5000	1350
1,2-Dichloroethane (EDC)	568000		5000	2000
Benzene	ND		5000	1050
Trichloroethene	ND		5000	1400
1,2-Dichloropropane	ND		5000	1450
Bromodichloromethane	ND		5000	1650
2-Chloroethyl vinyl ether	ND		5000	1150
cis-1,3-Dichloropropene	ND		5000	1100
Toluene	ND		5000	1150
trans-1,3-Dichloropropene	ND		5000	1150
1,1,2-Trichloroethane	3340	J	5000	1050
Tetrachloroethene	ND		5000	1100
Dibromochloromethane	ND		5000	1250
Chlorobenzene	ND		5000	1100
Ethylbenzene	ND		5000	1450
Total Xylenes	ND		10000	3400
Bromoform	ND		5000	1300
1,1,2,2-Tetrachloroethane	ND		5000	1650
1,3-Dichlorobenzene	ND		5000	1250
1,4-Dichlorobenzene	ND		5000	1100
1,2-Dichlorobenzene	ND		5000	1200
Total Target Compounds (37):	612000	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-007
Client ID: S-H/B_AQUEOUS_
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3811.D

GC/MS Column: DB-624
Sample wt/vol: 0.05ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 100
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	1150		100	36.0
Vinyl chloride	ND		100	33.0
Bromomethane	ND		100	40.0
Chloroethane	ND		100	40.0
Trichlorofluoromethane	ND		100	34.0
Acrolein	ND		2000	257
1,1-Dichloroethene	ND		100	31.0
Methylene chloride	9420		200	198
Acrylonitrile	ND		2000	166
tert-Butyl alcohol (TBA)	ND		200	83.0
trans-1,2-Dichloroethene	ND		100	37.0
Methyl tert-butyl ether (MTBE)	ND		100	30.0
1,1-Dichloroethane	211		100	21.0
cis-1,2-Dichloroethene	ND		100	34.0
Chloroform	15400		100	24.0
1,1,1-Trichloroethane	143		100	33.0
Carbon tetrachloride	133		100	27.0
1,2-Dichloroethane (EDC)	2750		100	40.0
Benzene	ND		100	21.0
Trichloroethene	ND		100	28.0
1,2-Dichloropropane	ND		100	29.0
Bromodichloromethane	168		100	33.0
2-Chloroethyl vinyl ether	ND		100	23.0
cis-1,3-Dichloropropene	ND		100	22.0
Toluene	ND		100	23.0
trans-1,3-Dichloropropene	ND		100	23.0
1,1,2-Trichloroethane	8310		100	21.0
Tetrachloroethene	28.1	J	100	22.0
Dibromochloromethane	ND		100	25.0
Chlorobenzene	ND		100	22.0
Ethylbenzene	ND		100	29.0
Total Xylenes	ND		200	68.0
Bromoform	ND		100	26.0
1,1,2,2-Tetrachloroethane	659		100	33.0
1,3-Dichlorobenzene	ND		100	25.0
1,4-Dichlorobenzene	ND		100	22.0
1,2-Dichlorobenzene	ND		100	24.0
Total Target Compounds (37):	38400	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-008
Client ID: S-H/C_AQUEOUS
Date Received: 09/21/2012
Date Analyzed: 09/26/2012
Data file: L3770.D

GC/MS Column: DB-624
Sample wt/vol: 0.05ml
Matrix-Units: Aqueous-µg/L (ppb)
Dilution Factor: 100
% Moisture: 100

Compound	Concentration	Q	RL	MDL
Chloromethane	571		100	36.0
Vinyl chloride	ND		100	33.0
Bromomethane	ND		100	40.0
Chloroethane	ND		100	40.0
Trichlorofluoromethane	ND		100	34.0
Acrolein	ND		2000	257
1,1-Dichloroethene	ND		100	31.0
Methylene chloride	4490		200	198
Acrylonitrile	ND		2000	166
tert-Butyl alcohol (TBA)	ND		200	83.0
trans-1,2-Dichloroethene	ND		100	37.0
Methyl tert-butyl ether (MTBE)	ND		100	30.0
1,1-Dichloroethane	64.8	J	100	21.0
cis-1,2-Dichloroethene	ND		100	34.0
Chloroform	8210		100	24.0
1,1,1-Trichloroethane	107		100	33.0
Carbon tetrachloride	109		100	27.0
1,2-Dichloroethane (EDC)	200		100	40.0
Benzene	ND		100	21.0
Trichloroethene	ND		100	28.0
1,2-Dichloropropane	ND		100	29.0
Bromodichloromethane	89.1	J	100	33.0
2-Chloroethyl vinyl ether	ND		100	23.0
cis-1,3-Dichloropropene	ND		100	22.0
Toluene	ND		100	23.0
trans-1,3-Dichloropropene	ND		100	23.0
1,1,2-Trichloroethane	2650		100	21.0
Tetrachloroethene	ND		100	22.0
Dibromochloromethane	ND		100	25.0
Chlorobenzene	ND		100	22.0
Ethylbenzene	ND		100	29.0
Total Xylenes	ND		200	68.0
Bromoform	ND		100	26.0
1,1,2,2-Tetrachloroethane	410		100	33.0
1,3-Dichlorobenzene	ND		100	25.0
1,4-Dichlorobenzene	ND		100	22.0
1,2-Dichlorobenzene	ND		100	24.0
Total Target Compounds (37):	16900	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-009
Client ID: S-A/CONTROL_SO
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3793.D

GC/MS Column: DB-624
Sample wt/vol: 0.01g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 500
% Moisture: 18.1

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.611	0.140
Vinyl chloride	ND		0.611	0.403
Bromomethane	ND		0.611	0.336
Chloroethane	ND		0.611	0.256
Trichlorofluoromethane	ND		0.611	0.287
Acrolein	ND		12.2	1.45
1,1-Dichloroethene	ND		0.611	0.507
Methylene chloride	ND		1.22	1.21
Acrylonitrile	ND		12.2	0.958
tert-Butyl alcohol (TBA)	ND		1.22	0.446
trans-1,2-Dichloroethene	ND		0.611	0.311
Methyl tert-butyl ether (MTBE)	ND		0.611	0.171
1,1-Dichloroethane	0.416	J	0.611	0.250
cis-1,2-Dichloroethene	ND		0.611	0.226
Chloroform	5.41		0.611	0.226
1,1,1-Trichloroethane	ND		0.611	0.287
Carbon tetrachloride	ND		0.611	0.433
1,2-Dichloroethane (EDC)	116		0.611	0.147
Benzene	ND		0.611	0.147
Trichloroethene	ND		0.611	0.293
1,2-Dichloropropane	ND		0.611	0.226
Bromodichloromethane	ND		0.611	0.189
2-Chloroethyl vinyl ether	ND		0.611	0.214
cis-1,3-Dichloropropene	ND		0.611	0.159
Toluene	ND		0.611	0.140
trans-1,3-Dichloropropene	ND		0.611	0.134
1,1,2-Trichloroethane	0.697		0.611	0.165
Tetrachloroethene	ND		0.611	0.305
Dibromochloromethane	ND		0.611	0.189
Chlorobenzene	ND		0.611	0.201
Ethylbenzene	ND		0.611	0.220
Total Xylenes	ND		1.22	0.421
Bromoform	ND		0.611	0.140
1,1,2,2-Tetrachloroethane	ND		0.611	0.147
1,3-Dichlorobenzene	ND		0.611	0.201
1,4-Dichlorobenzene	ND		0.611	0.171
1,2-Dichlorobenzene	ND		0.611	0.201
Total Target Compounds (37):	123	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-010
Client ID: S-A/A_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3795.D

GC/MS Column: DB-624
Sample wt/vol: 0.01g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 500
% Moisture: 19.9

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.624	0.144
Vinyl chloride	ND		0.624	0.412
Bromomethane	ND		0.624	0.343
Chloroethane	ND		0.624	0.262
Trichlorofluoromethane	ND		0.624	0.293
Acrolein	ND		12.5	1.49
1,1-Dichloroethene	ND		0.624	0.518
Methylene chloride	ND		1.25	1.24
Acrylonitrile	ND		12.5	0.980
tert-Butyl alcohol (TBA)	ND		1.25	0.456
trans-1,2-Dichloroethene	ND		0.624	0.318
Methyl tert-butyl ether (MTBE)	ND		0.624	0.175
1,1-Dichloroethane	0.469	J	0.624	0.256
cis-1,2-Dichloroethene	ND		0.624	0.231
Chloroform	4.54		0.624	0.231
1,1,1-Trichloroethane	ND		0.624	0.293
Carbon tetrachloride	ND		0.624	0.443
1,2-Dichloroethane (EDC)	124		0.624	0.150
Benzene	ND		0.624	0.150
Trichloroethene	ND		0.624	0.300
1,2-Dichloropropane	ND		0.624	0.231
Bromodichloromethane	ND		0.624	0.194
2-Chloroethyl vinyl ether	ND		0.624	0.218
cis-1,3-Dichloropropene	ND		0.624	0.162
Toluene	ND		0.624	0.144
trans-1,3-Dichloropropene	ND		0.624	0.137
1,1,2-Trichloroethane	ND		0.624	0.169
Tetrachloroethene	ND		0.624	0.312
Dibromochloromethane	ND		0.624	0.194
Chlorobenzene	ND		0.624	0.206
Ethylbenzene	ND		0.624	0.225
Total Xylenes	ND		1.25	0.431
Bromoform	ND		0.624	0.144
1,1,2,2-Tetrachloroethane	ND		0.624	0.150
1,3-Dichlorobenzene	ND		0.624	0.206
1,4-Dichlorobenzene	ND		0.624	0.175
1,2-Dichlorobenzene	ND		0.624	0.206
Total Target Compounds (37):	129	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-011
Client ID: S-A/B_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3783.D

GC/MS Column: DB-624
Sample wt/vol: 0.05g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 100
% Moisture: 19.9

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.125	0.029
Vinyl chloride	0.551		0.125	0.082
Bromomethane	ND		0.125	0.069
Chloroethane	ND		0.125	0.052
Trichlorofluoromethane	ND		0.125	0.059
Acrolein	ND		2.50	0.297
1,1-Dichloroethene	ND		0.125	0.104
Methylene chloride	ND		0.250	0.247
Acrylonitrile	ND		2.50	0.196
tert-Butyl alcohol (TBA)	ND		0.250	0.091
trans-1,2-Dichloroethene	ND		0.125	0.064
Methyl tert-butyl ether (MTBE)	ND		0.125	0.035
1,1-Dichloroethane	0.076	J	0.125	0.051
cis-1,2-Dichloroethene	ND		0.125	0.046
Chloroform	0.201		0.125	0.046
1,1,1-Trichloroethane	ND		0.125	0.059
Carbon tetrachloride	ND		0.125	0.089
1,2-Dichloroethane (EDC)	12.8		0.125	0.030
Benzene	ND		0.125	0.030
Trichloroethene	ND		0.125	0.060
1,2-Dichloropropane	ND		0.125	0.046
Bromodichloromethane	ND		0.125	0.039
2-Chloroethyl vinyl ether	ND		0.125	0.044
cis-1,3-Dichloropropene	ND		0.125	0.032
Toluene	ND		0.125	0.029
trans-1,3-Dichloropropene	ND		0.125	0.027
1,1,2-Trichloroethane	ND		0.125	0.034
Tetrachloroethene	ND		0.125	0.062
Dibromochloromethane	ND		0.125	0.039
Chlorobenzene	ND		0.125	0.041
Ethylbenzene	ND		0.125	0.045
Total Xylenes	ND		0.250	0.086
Bromoform	ND		0.125	0.029
1,1,2,2-Tetrachloroethane	ND		0.125	0.030
1,3-Dichlorobenzene	ND		0.125	0.041
1,4-Dichlorobenzene	ND		0.125	0.035
1,2-Dichlorobenzene	ND		0.125	0.041
Total Target Compounds (37):	13.6	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-012
Client ID: S-A/C_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3780.D

GC/MS Column: DB-624
Sample wt/vol: 0.05g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 100
% Moisture: 17.6

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.121	0.028
Vinyl chloride	ND		0.121	0.080
Bromomethane	ND		0.121	0.067
Chloroethane	ND		0.121	0.051
Trichlorofluoromethane	ND		0.121	0.057
Acrolein	ND		2.43	0.289
1,1-Dichloroethene	ND		0.121	0.101
Methylene chloride	ND		0.243	0.240
Acrylonitrile	ND		2.43	0.191
tert-Butyl alcohol (TBA)	ND		0.243	0.089
trans-1,2-Dichloroethene	ND		0.121	0.062
Methyl tert-butyl ether (MTBE)	ND		0.121	0.034
1,1-Dichloroethane	ND		0.121	0.050
cis-1,2-Dichloroethene	ND		0.121	0.045
Chloroform	ND		0.121	0.045
1,1,1-Trichloroethane	ND		0.121	0.057
Carbon tetrachloride	ND		0.121	0.086
1,2-Dichloroethane (EDC)	0.063	J	0.121	0.029
Benzene	ND		0.121	0.029
Trichloroethene	ND		0.121	0.058
1,2-Dichloropropane	ND		0.121	0.045
Bromodichloromethane	ND		0.121	0.038
2-Chloroethyl vinyl ether	ND		0.121	0.043
cis-1,3-Dichloropropene	ND		0.121	0.032
Toluene	ND		0.121	0.028
trans-1,3-Dichloropropene	ND		0.121	0.027
1,1,2-Trichloroethane	ND		0.121	0.033
Tetrachloroethene	ND		0.121	0.061
Dibromochloromethane	ND		0.121	0.038
Chlorobenzene	ND		0.121	0.040
Ethylbenzene	ND		0.121	0.044
Total Xylenes	ND		0.243	0.084
Bromoform	ND		0.121	0.028
1,1,2,2-Tetrachloroethane	ND		0.121	0.029
1,3-Dichlorobenzene	ND		0.121	0.040
1,4-Dichlorobenzene	ND		0.121	0.034
1,2-Dichlorobenzene	ND		0.121	0.040
Total Target Compounds (37):	0.063	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-013
Client ID: S-H/CONTROL_SO
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3784.D

GC/MS Column: DB-624
Sample wt/vol: 0.01g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 500
% Moisture: 17.9

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.609	0.140
Vinyl chloride	ND		0.609	0.402
Bromomethane	ND		0.609	0.335
Chloroethane	ND		0.609	0.256
Trichlorofluoromethane	ND		0.609	0.286
Acrolein	ND		12.2	1.45
1,1-Dichloroethene	ND		0.609	0.505
Methylene chloride	ND		1.22	1.21
Acrylonitrile	ND		12.2	0.956
tert-Butyl alcohol (TBA)	ND		1.22	0.445
trans-1,2-Dichloroethene	ND		0.609	0.311
Methyl tert-butyl ether (MTBE)	ND		0.609	0.171
1,1-Dichloroethane	ND		0.609	0.250
cis-1,2-Dichloroethene	ND		0.609	0.225
Chloroform	2.75		0.609	0.225
1,1,1-Trichloroethane	ND		0.609	0.286
Carbon tetrachloride	ND		0.609	0.432
1,2-Dichloroethane (EDC)	74.0		0.609	0.146
Benzene	ND		0.609	0.146
Trichloroethene	ND		0.609	0.292
1,2-Dichloropropane	ND		0.609	0.225
Bromodichloromethane	ND		0.609	0.189
2-Chloroethyl vinyl ether	ND		0.609	0.213
cis-1,3-Dichloropropene	ND		0.609	0.158
Toluene	ND		0.609	0.140
trans-1,3-Dichloropropene	ND		0.609	0.134
1,1,2-Trichloroethane	0.491	J	0.609	0.164
Tetrachloroethene	ND		0.609	0.305
Dibromochloromethane	ND		0.609	0.189
Chlorobenzene	ND		0.609	0.201
Ethylbenzene	ND		0.609	0.219
Total Xylenes	ND		1.22	0.420
Bromoform	ND		0.609	0.140
1,1,2,2-Tetrachloroethane	ND		0.609	0.146
1,3-Dichlorobenzene	ND		0.609	0.201
1,4-Dichlorobenzene	ND		0.609	0.171
1,2-Dichlorobenzene	ND		0.609	0.201
Total Target Compounds (37):	77.2	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-014
Client ID: S-H/A_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3791.D

GC/MS Column: DB-624
Sample wt/vol: 0.01g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 500
% Moisture: 17.8

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.608	0.140
Vinyl chloride	ND		0.608	0.401
Bromomethane	ND		0.608	0.335
Chloroethane	ND		0.608	0.255
Trichlorofluoromethane	ND		0.608	0.286
Acrolein	ND		12.2	1.45
1,1-Dichloroethene	ND		0.608	0.505
Methylene chloride	ND		1.22	1.20
Acrylonitrile	ND		12.2	0.955
tert-Butyl alcohol (TBA)	ND		1.22	0.444
trans-1,2-Dichloroethene	ND		0.608	0.310
Methyl tert-butyl ether (MTBE)	ND		0.608	0.170
1,1-Dichloroethane	ND		0.608	0.249
cis-1,2-Dichloroethene	ND		0.608	0.225
Chloroform	2.90		0.608	0.225
1,1,1-Trichloroethane	ND		0.608	0.286
Carbon tetrachloride	ND		0.608	0.432
1,2-Dichloroethane (EDC)	75.0		0.608	0.146
Benzene	ND		0.608	0.146
Trichloroethene	ND		0.608	0.292
1,2-Dichloropropane	ND		0.608	0.225
Bromodichloromethane	ND		0.608	0.189
2-Chloroethyl vinyl ether	ND		0.608	0.213
cis-1,3-Dichloropropene	ND		0.608	0.158
Toluene	ND		0.608	0.140
trans-1,3-Dichloropropene	ND		0.608	0.134
1,1,2-Trichloroethane	0.503	J	0.608	0.164
Tetrachloroethene	ND		0.608	0.304
Dibromochloromethane	ND		0.608	0.189
Chlorobenzene	ND		0.608	0.201
Ethylbenzene	ND		0.608	0.219
Total Xylenes	ND		1.22	0.420
Bromoform	ND		0.608	0.140
1,1,2,2-Tetrachloroethane	ND		0.608	0.146
1,3-Dichlorobenzene	ND		0.608	0.201
1,4-Dichlorobenzene	ND		0.608	0.170
1,2-Dichlorobenzene	ND		0.608	0.201
Total Target Compounds (37):	78.4	J		

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-015
Client ID: S-H/B_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3781.D

GC/MS Column: DB-624
Sample wt/vol: 0.05g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 100
% Moisture: 16.9

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.120	0.028
Vinyl chloride	ND		0.120	0.079
Bromomethane	ND		0.120	0.066
Chloroethane	ND		0.120	0.051
Trichlorofluoromethane	ND		0.120	0.057
Acrolein	ND		2.41	0.286
1,1-Dichloroethene	ND		0.120	0.100
Methylene chloride	0.549		0.241	0.238
Acrylonitrile	ND		2.41	0.189
tert-Butyl alcohol (TBA)	ND		0.241	0.088
trans-1,2-Dichloroethene	ND		0.120	0.061
Methyl tert-butyl ether (MTBE)	ND		0.120	0.034
1,1-Dichloroethane	ND		0.120	0.049
cis-1,2-Dichloroethene	ND		0.120	0.045
Chloroform	0.553		0.120	0.045
1,1,1-Trichloroethane	ND		0.120	0.057
Carbon tetrachloride	ND		0.120	0.085
1,2-Dichloroethane (EDC)	0.487		0.120	0.029
Benzene	ND		0.120	0.029
Trichloroethene	ND		0.120	0.058
1,2-Dichloropropane	ND		0.120	0.045
Bromodichloromethane	ND		0.120	0.037
2-Chloroethyl vinyl ether	ND		0.120	0.042
cis-1,3-Dichloropropene	ND		0.120	0.031
Toluene	ND		0.120	0.028
trans-1,3-Dichloropropene	ND		0.120	0.026
1,1,2-Trichloroethane	0.585		0.120	0.032
Tetrachloroethene	ND		0.120	0.060
Dibromochloromethane	ND		0.120	0.037
Chlorobenzene	ND		0.120	0.040
Ethylbenzene	ND		0.120	0.043
Total Xylenes	ND		0.241	0.083
Bromoform	ND		0.120	0.028
1,1,2,2-Tetrachloroethane	ND		0.120	0.029
1,3-Dichlorobenzene	ND		0.120	0.040
1,4-Dichlorobenzene	ND		0.120	0.034
1,2-Dichlorobenzene	ND		0.120	0.040

Total Target Compounds (37): 2.17

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Lab ID: 09628-016
Client ID: S-H/C_SOIL_SAM
Date Received: 09/21/2012
Date Analyzed: 09/27/2012
Data file: L3782.D

GC/MS Column: DB-624
Sample wt/vol: 0.05g
Matrix-Units: Soil-mg/Kg (ppm)
Dilution Factor: 100
% Moisture: 18.6

Compound	Concentration	Q	RL	MDL
Chloromethane	ND		0.123	0.028
Vinyl chloride	ND		0.123	0.081
Bromomethane	ND		0.123	0.068
Chloroethane	ND		0.123	0.052
Trichlorofluoromethane	ND		0.123	0.058
Acrolein	ND		2.46	0.292
1,1-Dichloroethene	ND		0.123	0.102
Methylene chloride	0.372		0.246	0.243
Acrylonitrile	ND		2.46	0.193
tert-Butyl alcohol (TBA)	ND		0.246	0.090
trans-1,2-Dichloroethene	ND		0.123	0.063
Methyl tert-butyl ether (MTBE)	ND		0.123	0.034
1,1-Dichloroethane	ND		0.123	0.050
cis-1,2-Dichloroethene	ND		0.123	0.045
Chloroform	0.409		0.123	0.045
1,1,1-Trichloroethane	ND		0.123	0.058
Carbon tetrachloride	ND		0.123	0.087
1,2-Dichloroethane (EDC)	0.053	J	0.123	0.030
Benzene	ND		0.123	0.030
Trichloroethene	ND		0.123	0.059
1,2-Dichloropropane	ND		0.123	0.045
Bromodichloromethane	ND		0.123	0.038
2-Chloroethyl vinyl ether	ND		0.123	0.043
cis-1,3-Dichloropropene	ND		0.123	0.032
Toluene	ND		0.123	0.028
trans-1,3-Dichloropropene	ND		0.123	0.027
1,1,2-Trichloroethane	0.176		0.123	0.033
Tetrachloroethene	ND		0.123	0.061
Dibromochloromethane	ND		0.123	0.038
Chlorobenzene	ND		0.123	0.041
Ethylbenzene	ND		0.123	0.044
Total Xylenes	ND		0.246	0.085
Bromoform	ND		0.123	0.028
1,1,2,2-Tetrachloroethane	ND		0.123	0.030
1,3-Dichlorobenzene	ND		0.123	0.041
1,4-Dichlorobenzene	ND		0.123	0.034
1,2-Dichlorobenzene	ND		0.123	0.041
Total Target Compounds (37):	1.01	J		

SAMPLE TRACKING

IAL Integrated Analytical Laboratories LLC
Integrated Analytical Labs
273 Franklin Road
Randolph, NJ 07869

Contact Us: 973-361-4252
Fax: 973-989-5288
Web: www.ialonline.com

CUSTOMER INFO		REPORTING INFO	
Company:	ISOTEC - NJ	REPORT TO:	
Address:		Address:	
Telephone #:		Attn:	
Fax #:		FAX #	
Project Manager:	Prasad Kakarla	INVOICE TO:	
EMAIL Address:		Address:	
Sampler:	Yan Chin		
Project Name:	PBAW/Formosa Plastics	Attn:	
Project Location (State):	TX		
Bottle Order #:		PO #	4260
Quote #:	901132		

Turnaround Time: (starts the following day if samples rec'd at lab > 5PM)

*Lab notification is required for RUSH TAT prior to sample arrival. RUSH TAT IS NOT GUARANTEED WITHOUT LAB APPROVAL. **RUSH SURCHARGES WILL APPLY IF ABLE TO ACCOMMODATE

PHC - MUST CHOOSE

NJ EPH DRO (5 day TAT) NJ EPH Fractionated (5 day TAT)
NJ EPH - C40 (5 day TAT)
DRO-8015 (3-5 day TAT) OAM025 (5 day TAT)

Verbal/Fax: Std 2 wk unless otherwise specified

24 hr** 48 hr** 72 hr** 96 hr** 1 wk**

Other** (specify):

Hard Copy: Std 3 week * Other - call for price

Rush TAT Charge **: 24 hr - 100%... 48 hr - 75%.... 72 hr - 50%.... 96 hr - 35%.... 5 day - 25%.... 6-9 day 10%

Report Format: (Results Only) Reduced Regulatory - 15% Surcharge applies Other (describe)

EDDs: NJ SRP format NYSDEC lab approved custom EDD NO EDD/CD REQ'D

Cooler Temp 4 °C

SAMPLE INFORMATION

Sample Matrix
DW - Drinking Water AQ - Aqueous WW - Waste Water
OI - Oil LIQ - Liquid (Specify) OT - Other (Specify)
S - Soil SL - Sludge SOL - Solid W - Wipe

ANALYTICAL PARAMETERS

BOTTLES & PRESERVATIVES

Client ID	Depth (ft only)	Sampling Date	Sampling Time	Matrix	# container	IAL #	VOCs	HCL	HNO3	MeOH	NaOH	H2SO4	Other	None	Encore
S-A/Control		9/21/12	4PM	AQ+S	1+1	1	X	1						1	
S-A/A						2									
S-A/B						3									
S-A/C						4									
S-H/Control *						5									
S-H/A **						6									
S-H/B **						7									
S-H/C **						8									

All samples are analyzed with standard TAT except indicated below:

* Rush, 3-day TAT

** Hold for further instructions

Known Hazard: Yes or No Describe:

Conc. Expected: Low Med High

MDL Req: GWQS (11/05) - SRS - SRS/IGW - SRS Residential - OTHER (SEE COMMENTS)

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved.

Carrier (check one): IAL Courier Client Courier FedEx/UPS

Signature/Company	Date	Time	Signature/Company	Date	Time
Relinquished by:	9/21/12	2PM	Received by:	9/21/12	1510
Relinquished by:	9/21/12	1845	Received by:	9/21/12	1845
Relinquished by:			Received by:		
Relinquished by:			Received by:		
Relinquished by:			Received by:		

Comments: Use lowest MDLs possible. MDLs for "Control" should NOT be lower than MDLs for other samples.

Lab Case # 09628

PAGE: 1 of

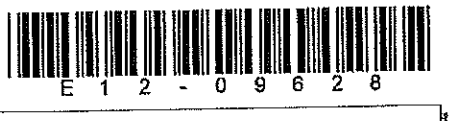
LAB COPIES - WHITE & YELLOW; CLIENT COPY - PINK

IA2012 REV COC

01/2012 rev

PROJECT INFORMATION

** RUSH **



Case No. E12-09628 Project PB&W/FORMOSA PLASTICS - 901132

Customer Isotec

Contact Prasad Kakarla

EMail pkakarla@insituoxidation.com; ychin@insituoxidation.com ☑ EMail EDDs

Phone (609) 275-8500 Fax 1(609) 275-9608

P.O. # 4260

Received 9/21/2012 18:45

Verbal Due 10/12/2012

Report Due 10/19/2012

Report To

11 Princess Road

Suite A

Lawrenceville, NJ 08648

Attn: Prasad Kakarla

Bill To

11 Princess Road

Suite A

Lawrenceville, NJ 08648

Attn: Prasad Kakarla

Report Format Result Only

Additional Info ☐ State Form ☐ Field Sampling ☐ Conditional VOA

Lab ID	Client Sample ID	Depth Top / Bottom	Sampling Time	Matrix	Unit	# of Containers
09628-001	S-A/CONTROL AQUEOUS SAM	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-002	S-A/A AQUEOUS SAMPLE	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-003	S-A/B AQUEOUS SAMPLE	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-004	S-A/C AQUEOUS SAMPLE	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-005	S-H/CONTROL AQUEOUS SAM	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-006	S-H/A AQUEOUS SAMPLE	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-007	S-H/B AQUEOUS SAMPLE	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-008	S-H/C AQUEOUS	n/a	9/21/2012@13:00	Aqueous	ug/L	1
09628-009	S-A/CONTROL SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-010	S-A/A SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-011	S-A/B SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-012	S-A/C SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-013	S-H/CONTROL SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-014	S-H/A SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-015	S-H/B SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1
09628-016	S-H/C SOIL SAMPLE	n/a	9/21/2012@13:00	Soil	mg/Kg	1

Sample #	Tests	Status	QA Method
001	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
002	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
003	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
004	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
005	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
006	PP VO + Cis 1,2-DCE + MTBE_TBA	Run	8260B
007	PP VO + Cis 1,2-DCE + MTBE_TBA	Run	8260B
008	PP VO + Cis 1,2-DCE + MTBE_TBA	Run	8260B
009	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
010	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
011	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B
012	PP VO + Cis 1,2-DCE + MTBE_TBA	Complete	8260B

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September 28, 2012

PROJECT INFORMATION

** RUSH **

E12-09628

Case No. E12-09628 Project PB&W/FORMOSA PLASTICS - 901132

Sample #	Tests	Status	QA Method
013	PP VO + Cis 1,2-DCE + MTBE .TBA	Complete	8260B
014	PP VO + Cis 1,2-DCE + MTBE .TBA	Run	8260B
015	PP VO + Cis 1,2-DCE + MTBE .TBA	Run	8260B
016	PP VO + Cis 1,2-DCE + MTBE .TBA	Run	8260B

09/25/2012 10:29 by Ellen - NOTE 1

BOTH SOIL & AQUEOUS LISTED AS MATRIX FOR EACH SAMPLE. RECEIVED 1 PRESERVED VO VIAL W/ SMALL AMOUNT OF SEDIMENT & 1 SOIL JAR W/ SEDIMENT & SMALL AMOUNT OF WATER.

AS PER YAN C., VO VIALS SHOULD GET ONE SAMPLE # & SOIL JAR TO GET SEPARATE #. EACH TO BE ANALYZED FOR VO. SMALL AMOUNT OF SEDIMENT IN AQUEOUS VIALS BUT ANALYZE AQUEOUS PORTION ONLY. VO VIALS TO BE LABELED AS #1 - #8. DECANT WATER OFF OF SOIL JAR SAMPLES & ANALYZE SOIL PORTION. SOIL JARS TO BE LABELED AS SAMPLES #9 - #16.

AQ. SAMPLE #5 & SOIL SAMPLE #13 TO BE ANALYZED ON A 48 HR TAT. FAX DUE 9/27/12.

PLEASE USE LOWEST MDLs POSSIBLE. MDLs FOR CONTROL SAMPLES SHOULD NOT BE LOWER THAN MDLs FOR OTHER SAMPLES.

09/25/2012 13:57 by Ellen - NOTE 2

SAMPLE PREP = PLEASE DECANT OFF WATER FROM SOIL SAMPLES.

09/28/2012 09:41 by melissa - REV 1

REV 01 DUE 10/12

AS PER YAN CHIN, ACTIVATE SAMPLES 006 THRU 008 AND 014 THRU 016 FOR VO ON A STANDARD TURN.

RESULTS SENT 9/27

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September 28, 2012

E12-09628 0025

INTEGRATED ANALYTICAL LABORATORIES, LLC

SAMPLE RECEIPT VERIFICATION

CASE NO: **E 12** **09628** CLIENT: ISOTEC

COOLER TEMPERATURE: 2° - 6°C: ✓ (See Chain of Custody)

Comments

COC: (COMPLETE) / INCOMPLETE

KEY

✓ = YES/NA
✗ = NO

✓	Bottles Intact
✓	no-Missing Bottles
✓	no-Extra Bottles
✓	Sufficient Sample Volume
✓	no-headspace/bubbles in VOs
✓	Labels intact/correct
✓	pH Check (exclude VOs)[1]
✓	Correct bottles/preservative
✓	Sufficient Holding/Prep Time[1]
[ ]	Sample to be Subcontracted
✓	**Chain of Custody is Clear**

[1] All samples with "Analyze Immediately" holding times will be analyzed by this laboratory past the holding time. This includes but is not limited to the following tests: pH, Temperature, Free Residual Chlorine, Total Residual Chlorine, Dissolved Oxygen, Sulfite.

ADDITIONAL COMMENTS:

SAMPLE(S) VERIFIED BY: INITIAL [ ] DATE 9/21/12

CORRECTIVE ACTION REQUIRED: **YES** [ ] (SEE BELOW) **NO** [ ]

If COC is **NOT** clear, ***STOP*** until you get client to authorize/clarify work.

CLIENT NOTIFIED: YES [ ] Date/ Time: _____ NO [ ]

PROJECT CONTACT:

SUBCONTRACTED LAB:

DATE SHIPPED:

ADDITIONAL COMMENTS:

VERIFIED/TAKEN BY: INITIAL KG DATE 9/25/12

Laboratory Custody Chronicle

IAL Case No.

E12-09628

Client Isotec

Project PB&W/FORMOSA PLASTICS - 901132

Received On 9/21/2012@18:45

Department: Volatiles			*Prep. Date*	*Analyst*	*Analysis Date*	*Analyst*
PP VO + Cis 1,2-DCE + MTBE & TBA	09628-001	Aqueous	n/a	n/a	9/26/12	Mei
"	-002	"	n/a	n/a	9/26/12	Mei
"	-003	"	n/a	n/a	9/26/12	Mei
"	-004	"	n/a	n/a	9/26/12	Mei
"	-005	"	n/a	n/a	9/26/12	Mei
"	-006	"	n/a	n/a	9/27/12	Mei
"	-007	"	n/a	n/a	9/27/12	Mei
"	-008	"	n/a	n/a	9/27/12	Mei
"	-009	Soil	n/a	n/a	9/26/12	Mei
"	-010	"	n/a	n/a	9/26/12	Mei
"	-011	"	n/a	n/a	9/26/12	Mei
"	-012	"	n/a	n/a	9/26/12	Mei
"	-013	"	n/a	n/a	9/26/12	Mei
"	-014	"	n/a	n/a	9/27/12	Mei
"	-015	"	n/a	n/a	9/27/12	Mei
"	-016	"	n/a	n/a	9/27/12	Mei

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APPENDIX C

FMC Report – Enhanced Bioremediation

FMC

ENVIRONMENTAL SOLUTIONS

BENCH STUDY FOR THE TREATMENT OF CHLORINATED VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER AND SOIL FROM THE FORMOSA PLASTICS SITE IN POINT COMFORT, TX

FINAL REPORT – REVISION II

Prepared for:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX, 78446

Submitted by:
FMC Environmental Solutions Division
Project No.: FA12-233

March 2013

EXECUTIVE SUMMARY

A bench study was completed at the FMC Environmental Solutions laboratory in Mississauga, Ontario, Canada for treatment of groundwater impacted with chlorinated volatile organic compounds (cVOCs) from the Formosa Plastics site in Point Comfort, Texas (the Site). The purpose of the study was to evaluate EHC for treatment of the impacted groundwater and soil present at the Site. The main contaminants of concern were dichloroethane (1,2-DCA) and chloroform (CF).

The microcosm testing consisted of two controls (water and ambient) and one treatment (EHC). The effectiveness of the treatment was assessed using data collected in three sampling events over a period of 99 days.

The initial characterization of the Site groundwater revealed that the groundwater was impacted with 1,554,800 µg/L of VOCs. The main VOCs detected were: CF (100,000 µg/L) and 1,2-DCA (1,400,000 µg/L). The soil sample was impacted with 40,312 µg/kg of VOCs. The CF and 1,2-DCA concentrations were 1,700 µg/kg and 38,000 µg/kg, respectively. The composite groundwater was slightly acidic (pH = 6.41) and oxic (ORP = +51 mV). The homogenized soil had a pH of 7.8.

The EHC treatment supported reductions in CF and other VOCs (1,1,2-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, VC) over time, however, little reductions in 1,2-DCA were observed. Bioaugmentation of the EHC microcosm with a commercially available mixed culture (SDC-9 (*Dehalococcoides*) and TCA-20 (*Dehalobacter*); The Shaw Group) did not have an effect on the treatment of 1,2-DCA.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Project Background

FMC Environmental Solutions Division conducted a bench-scale study to determine the performance of an in-situ chemical reduction (ISCR) product, EHC®, for the treatment of chlorinated volatile organic compounds (cVOCs). Groundwater and soil impacted with cVOCs were collected from the Formosa Plastics Site in Point Comfort, TX. The main contaminant of concern was 1,2-dichloroethane and lower concentrations of chlorinated methanes, ethanes and ethenes were also present. This report was prepared for Pastor, Behling, and Wheeler, LLC and presents the results and data interpretation of the bench-scale study completed between September 2012 and February 2013.

1.2 EHC® Technology Background

EHC® technology describes a family of remediation products used for the in situ treatment of groundwater and saturated soil impacted by heavy metals and persistent organic compounds such as chlorinated solvents, pesticides and energetics. The technology is a modification of our Daramend® technology which has been used since 1992 to treat over 9,000,000 tons of similarly effected soil and sediment. Both EHC® and Daramend® reductive technologies are the subjects of numerous patents owned FMC Corporation.

EHC® technology is a controlled-release, integrated carbon and zero valent iron (ZVI) source that yields redox potentials (Eh) as low as -500 mV. This Eh is significantly lower than that achieved when using either organic materials (lactate, molasses, and sugars) or reduced metal alone. Eh potentials in this range facilitate the timely and effective removal of recalcitrant chlorinated organics (e.g., carbon tetrachloride, PCE) and other persistent compounds (e.g., perchlorate) with less formation of potentially problematic intermediates, such as DCE and VC from the anaerobic degradation of PCE and TCE or chloroform and dichloromethane from the anaerobic degradation of carbon tetrachloride.

Source: http://environmental.fmc.com/solutions/soil-ground-remediation/ehc-iscr-reagent/

2. PROJECT OBJECTIVES

The aim of this bench-scale study was to assess EHC for the treatment of cVOCs in the Site groundwater and soil. Specific objectives included:

- chemical characterization of the groundwater and soil samples;
- determination of the efficiency of the EHC product; and
- provide a comprehensive final report.

3. TASK 1 - SAMPLE PREPARATION AND CHARACTERIZATION

3.1 Sample Receipt and Sampling

On September 13, 2012, FMC received two coolers of samples from the Site. One cooler contained twelve 1 L bottles of groundwater (GW ID: P-56 Formosa 9/10/12). The other cooler contained eight 1 L bottles of groundwater (GW ID: P-56 Formosa 9/10/12) and three jars of soil (Soil ID: TS-1 9/4/12). All samples were placed into cold room storage upon receipt.

A composite groundwater sample was prepared by transferring the water from twelve bottles into a Tedlar bag via gravity. The composite groundwater was sampled for volatile organic compounds (VOCs), ferrous iron, sulfate, nitrate, alkalinity, total dissolved solids (TDS), and total organic carbon (TOC). The soil from the three containers was transferred into a plastic bag and homogenized by hand. The composite soil was sampled for VOCs. All samples were submitted to TestAmerica (Chicago, IL) for analysis. The pH and oxidation-reduction potential (ORP) of the soil and groundwater were measured at FMC.

3.2 Results

The groundwater sample was impacted with chlorinated ethenes, ethanes, chloroform and benzene (Table 1). All other volatile compounds were not detected in the groundwater. Lower concentrations of the same compounds were detected in the soil sample (Table 1). The composite groundwater had pH and ORP readings of 6.41 and +50 mV, respectively. The homogenized soil had a pH of 7.2 and an ORP of +140 mV.

Table 1: VOC concentrations, pH and ORP in the Site groundwater and soil samples

Parameter Name	Groundwater	Units	Soil	Units
Vinyl chloride	14,000	ug/L	20	ug/Kg
1,1-Dichloroethene	2,000	ug/L	ND (59)	ug/Kg
trans-1,2-Dichloroethene	4,900	ug/L	ND (59)	ug/Kg
1,1-Dichloroethane	9,300	ug/L	120	ug/Kg
cis-1,2-Dichloroethene	3,200	ug/L	35 J	ug/Kg
Chloroform	100,000	ug/L	1,700	ug/Kg
Benzene	3,400	ug/L	22	ug/Kg
Trichloroethene	5,300	ug/L	25 J	ug/Kg
1,1,2-Trichloroethane	10,000	ug/L	450	ug/Kg
Tetrachloroethene	2,700	ug/L	ND (59)	ug/Kg
Ethylbenzene	ND (500)	ug/L	8.1 J	ug/Kg
1,2-Dichloroethane	1,400,000	ug/L	38,000	ug/Kg
Total VOCs	**1,554,800**	**ug/L**	**40,312**	**ug/Kg**
pH	6.41	SI units	7.2	SI units
ORP	+50	mV	+140	mV

ND - Indicates the analyte was analyzed for but not detected (detection limit)
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

The inorganic chemistry of the Site groundwater is summarized in Table 2.

Table 2: Inorganic chemistry in the Site groundwater sample

Parameter	Value	Units
Nitrate as N	ND (2) H	mg/L
Sulfate	420	mg/L
TOC Dup	62	mg/L
Alkalinity	660	mg/L
Total Dissolved Solids	9,700	mg/L
Ferrous Iron	5.5 HF	mg/L

ND - Indicates the analyte was analyzed for but not detected (detection limit)
H - Sample was prepped or analyzed beyond the specified holding time
HF - Field parameter with a holding time of 15 minutes

4. TASK 2 – MICROCOSM STUDY

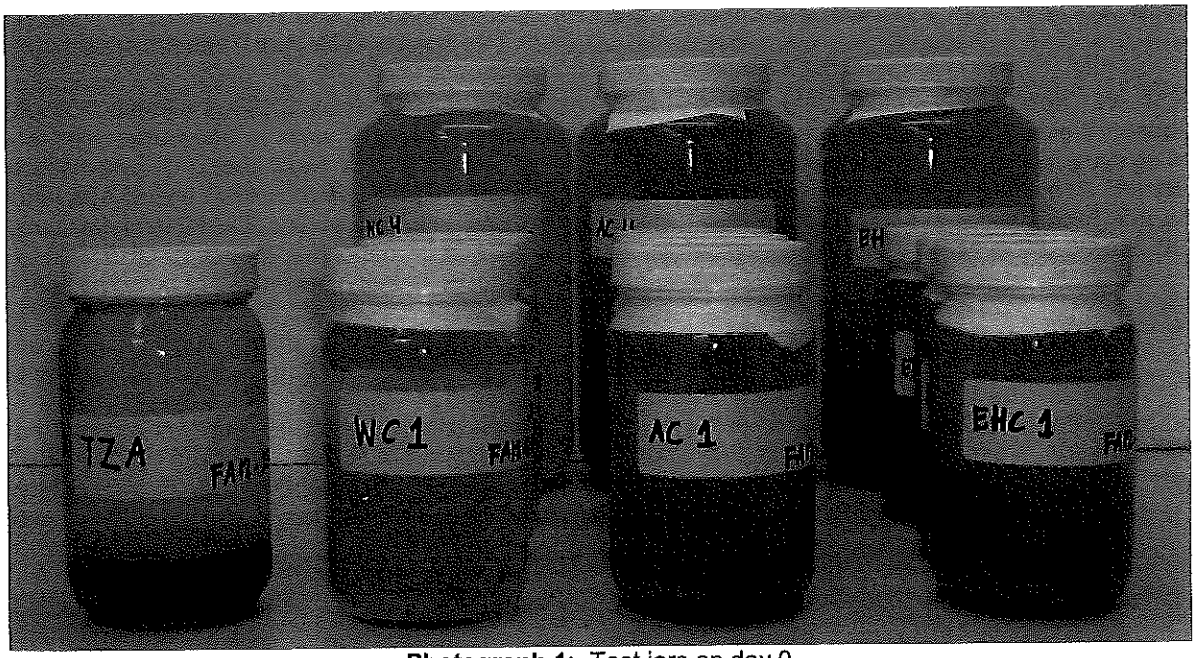
4.1 Methods

On October 22, 2012 the batch test was set up as outlined below (Table 3). One ISCR treatment (EHC) and two controls (groundwater and ambient) were evaluated with the Site samples as per the FA12-233 proposal dated July 12, 2012. Sacrificial jars (glass jars with Teflon lined lids) were set up for the controls and treatments. Two sizes of jars were used (250 mL and 1L) to allow for sampling of additional parameters during the final sampling event.

The groundwater control jars were filled with the Site groundwater to zero headspace and capped. The ambient control jars contained the homogenized Site soil (75 g for the 250 mL jar; 300 g for the 1L jar) and were filled with Site groundwater to zero headspace and capped. The EHC microcosms contained the homogenized Site soil (75 g for the 250 mL jar; 300 g for the 1L jar), 0.5% EHC (1.5 g for the 250 mL jar; 5.7 g for the 1L jar), and were filled with Site groundwater to zero headspace and capped. The mass of EHC added was based on the total mass of soil and groundwater in the microcosms. All microcosms were inverted several times to mix.

Table 3: Summary of EHC Microcosm Study

Test	Jar ID	Mass (g)		
		Soil	GW	EHC
Time Zero (baseline)	TZ A	75	220	---
Water Control	WC 1	---	260	---
	WC 2	---	262	---
	WC 3	---	261	---
	WC 4	---	997	---
Ambient Control	AC 1	75	222	---
	AC 2	76	220	---
	AC 3	75	221	---
	AC 4	301	836	---
EHC	EHC 1	75	219	1.5
	EHC 2	76	219	1.5
	EHC 3	75	220	1.5
	EHC 4	301	829	5.6



Photograph 1: Test jars on day 0

On October 22, 2012, the time zero samples were collected from the control jar (TZ A). A 50 mL glass on glass syringe was used to collect a sample of the groundwater and was placed directly into a 40 mL VOA vial. The VOC sample was submitted for VOCs (Method 8260B) analysis. ORP and pH were also monitored in the groundwater of the TZ A jar. The remaining microcosms were stored at room temperature and in the dark.

On November 19, 2012 (day 28) samples were collected from the controls (Jars WC1 and AC1) and the EHC treatment (EHC 1). Groundwater samples were collected from each microcosm as outlined above for the time zero sampling. All samples were submitted to TestAmerica (Chicago, IL) for analysis. ORP and pH were monitored in the groundwater of each microcosm using probes. The remaining microcosms were stored at room temperature and in the dark.

On December 17, 2012 (day 56) samples were collected from the controls (Jars WC2 and AC2) and the EHC treatment (EHC 2). The procedure outlined above for the first sampling event (day 28) was followed.

On January 15, 2013 (day 85) the pH in the remaining EHC microcosms (EHC Jar 3 and EHC Jar 4) was adjusted to near neutral with potassium bicarbonate. The EHC microcosms were then bioaugmented with a mixed culture of SDC-9 (*Dehalococcoides*) and TCA-20 (*Dehalobacter*). The Shaw Group provided a sample of the culture and based on the high VOC concentrations recommended a cell concentration of 7.5 x 10^9 cells/L.

On January 29, 2013, (two weeks after pH adjustment and bioaugmentation; day 99) samples were collected from the controls (Jars WC3 and AC3) and the EHC treatment (EHC 3). The procedure outlined above for the first sampling event (day 28) was followed.

On February 12, 2013, Pastor, Behling & Wheeler, LLC, requested terminating the bench scale study. Thus the fourth set of microcosms (WC4, AC4, EHC4) were not sampled as part of this study.

4.2 Results

The groundwater VOC concentrations in the controls decreased slightly over time (**Tables 4** and **5**). On day 99, the groundwater and ambient controls showed 28% and 6% reductions in total VOCs, when compared to the day 0 total VOC value.

The VOC data for the EHC microcosms is presented in **Table 6**. The EHC treatment supported 12%, 18% and 36% reductions in total VOCs on days 28, 56 and 99 when compared to the ambient control, respectively. The reductions in CF (**Figure 1**) on day 56 and 99 were accompanied by an increase in methylene chloride which confirms that reductive dechlorination was the mechanism of treatment. Smaller reductions in other VOCs were also observed, however, little treatment of 1,2-DCA was supported (**Figure 2**). The EHC treatment supported 10%, 15% and 34% reductions in 1,2-DCA on days 28, 56 and 99, when compared to the ambient control, respectively.

Following pH adjustment and bioaugmentation, the EHC treatment continued to support reductions in CF, however, little treatment of 1,2-DCA was supported (**Table 6**, **Figures 1** and **2**).

The groundwater and ambient controls showed that oxic (+200 to 400 mV) conditions were present (**Tables 4, 5, Figure 3**). Strong reducing conditions (-340 to -550 mV) were created in the jars amended with the EHC (**Table 6**, **Figure 3**). The increase in ORP observed on day 99 in the EHC microcosm may have been due to opening of the microcosm for pH adjustment and bioaugmentation.

The pH values of the EHC microcosms were slightly lower than those of the controls on days 28 and 56 (**Tables 4, 5, 6, Figure 4**). On day 99, the pH of the EHC microcosm increased to 6.3 due to the addition of potassium bicarbonate

Table 4: VOC concentrations, pH and ORP in the groundwater control

Parameter Name	Time Zero Jar (Ambient Control)	Water Control			Units
		Day 28	Day 56	Day 99	
1,1,2-Trichloroethane	7,800	9,600	7,900	6,200	ug/L
1,1-Dichloroethane	6,700	8,800	7,400	3,600	ug/L
1,1-Dichloroethene	1,300	ND (5,000)	1,400	ND (1,000)	ug/L
Benzene	2,400	2,900	2,400	1,200	ug/L
Chloroform	83,000	92,000	89,000	50,000	ug/L
cis-1,2-Dichloroethene	2,300	3300 J	2,500	1,400	ug/L
Ethylbenzene	ND (25)	ND (2,500)	ND (500)	ND (500)	ug/L
Methylene Chloride	1,200	ND (25,000)	ND (5,000)	ND (5,000)	ug/L
Tetrachloroethene	1,900	ND (5,000)	1,300	ND (1,000)	ug/L
trans-1,2-Dichloroethene	3,400	4000 J	3,400	1,300	ug/L
Trichloroethene	4,100	2,900	3,700	1,400	ug/L
Vinyl chloride	9,500	12,000	11,000	1,700	ug/L
1,2-Dichloroethane	1,500,000	1,200,000	1,400,000	1,100,000	ug/L
Total VOCs	**1,623;600**	**1,335,500**	**1,530,000**	**1,166,800**	**ug/L**
pH	6.04	6.04	6.00	6.1	SI units
ORP	+310	+450	+436	+412	mV

ND = non detect (detection limit)

Table 5: VOC concentrations, pH and ORP in the ambient control

Parameter Name	Time Zero Jar (Ambient Control)	Ambient Control			Units
		Day 28	Day 56	Day 99	
1,1,2-Trichloroethane	7,800	8,700	7,300	7,400	ug/L
1,1-Dichloroethane	6,700	9,500	6,600	7,100	ug/L
1,1-Dichloroethene	1,300	ND (5,000)	1,400	1,100	ug/L
Benzene	2,400	2,800	2,200	2,400	ug/L
Chloroform	83,000	99,000	82,000	83,000	ug/L
cis-1,2-Dichloroethene	2,300	3,400 J	2,200	2,300	ug/L
Ethylbenzene	ND (25)	ND (2,500)	ND (500)	ND (500)	ug/L
Methylene Chloride	1,200	ND (25,000)	ND (5,000)	ND (5,000)	ug/L
Tetrachloroethene	1,900	ND (5,000)	1,300	1,100	ug/L
trans-1,2-Dichloroethene	3,400	4,200 J	3,000	2,900	ug/L
Trichloroethene	4,100	2,500	3,400	2,900	ug/L
Vinyl chloride	9,500	13,000	10,000	8,600	ug/L
1,2-Dichloroethane	1,500,000	1,100,000	1,300,000	1,400,000	ug/L
Total VOCs	**1,623,600**	**1,243,100**	**1,419,400**	**1,518,800**	**ug/L**
pH	6.04	6.03	6.04	6.09	SI units
ORP	+310	+390	+423	+239	mV

ND = non detect (detection limit)

Table 6: VOC concentrations, pH and ORP in the EHC treatment

Parameter Name	Time Zero Jar (Ambient Control)	EHC			Units
		Day 28	Day 56	Day 99	
1,1,2-Trichloroethane	7,800	7,800	4,700	3,900	ug/L
1,1-Dichloroethane	6,700	8,200	4,800	4,600	ug/L
1,1-Dichloroethene	1,300	ND (2,500)	ND (1,000)	ND (1,000)	ug/L
Benzene	2,400	2,400	1,600	1,500	ug/L
Chloroform	83,000	66,000	34,000	17,000	ug/L
cis-1,2-Dichloroethene	2,300	2,500	1,600	ND (1,000)	ug/L
Ethylbenzene	ND (25)	ND (1,300)	ND (500)	ND (500)	ug/L
Methylene Chloride	1,200	ND (13,000)	6,300	9,700	ug/L
Tetrachloroethene	1,900	ND (2,500)	730	ND (1,000)	ug/L
trans-1,2-Dichloroethene	3,400	3,400	1,700	1,600	ug/L
Trichloroethene	4,100	2,600	2,100	ND (500)	ug/L
Vinyl chloride	9,500	7,400	4,500	6,500	ug/L
1,2-Dichloroethane	1,500,000	990,000	1,100,000	930,000	ug/L
Total VOCs	**1,623,600**	**1,090,300**	**1,162,030**	**974,800**	**ug/L**
pH	6.04	5.82	5.88	6.30	SI units
ORP	+310	-551	-506	-339	mV

ND = non detect (detection limit)

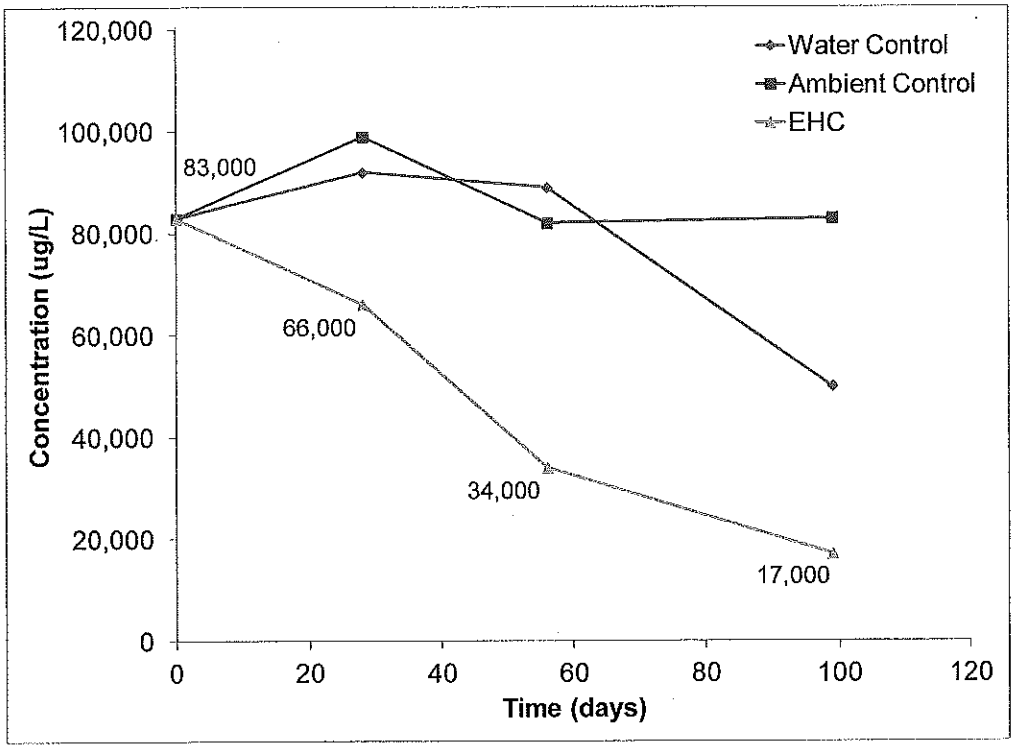


Figure 1: Influence of EHC on CF concentrations

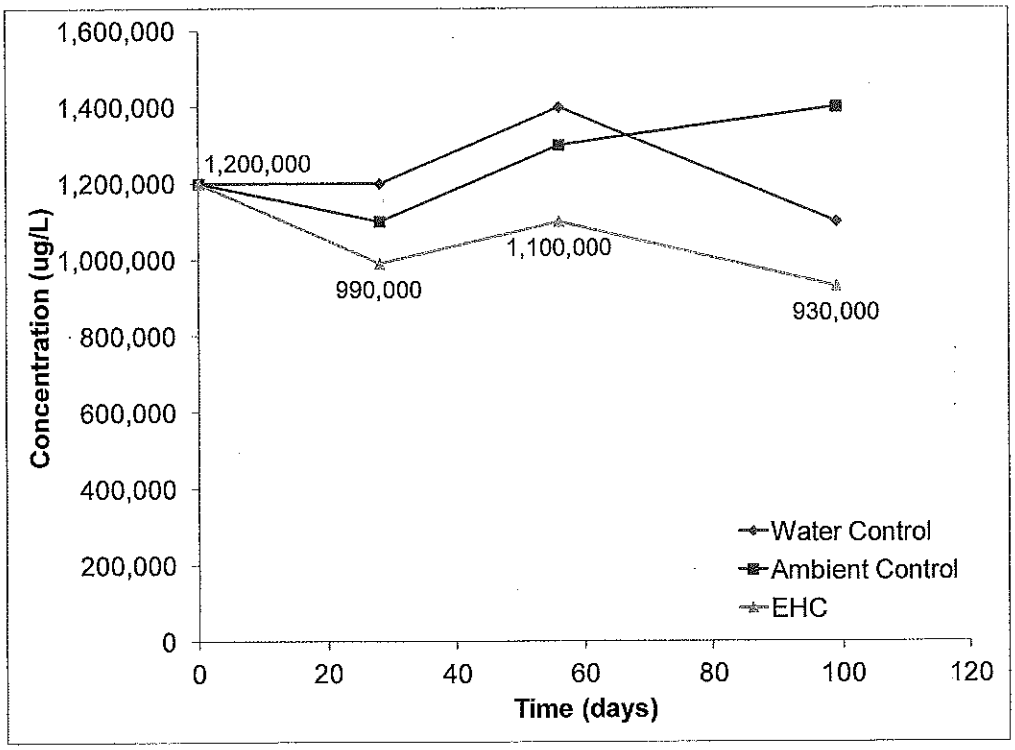


Figure 2: Influence of EHC on 1,2-DCA concentrations

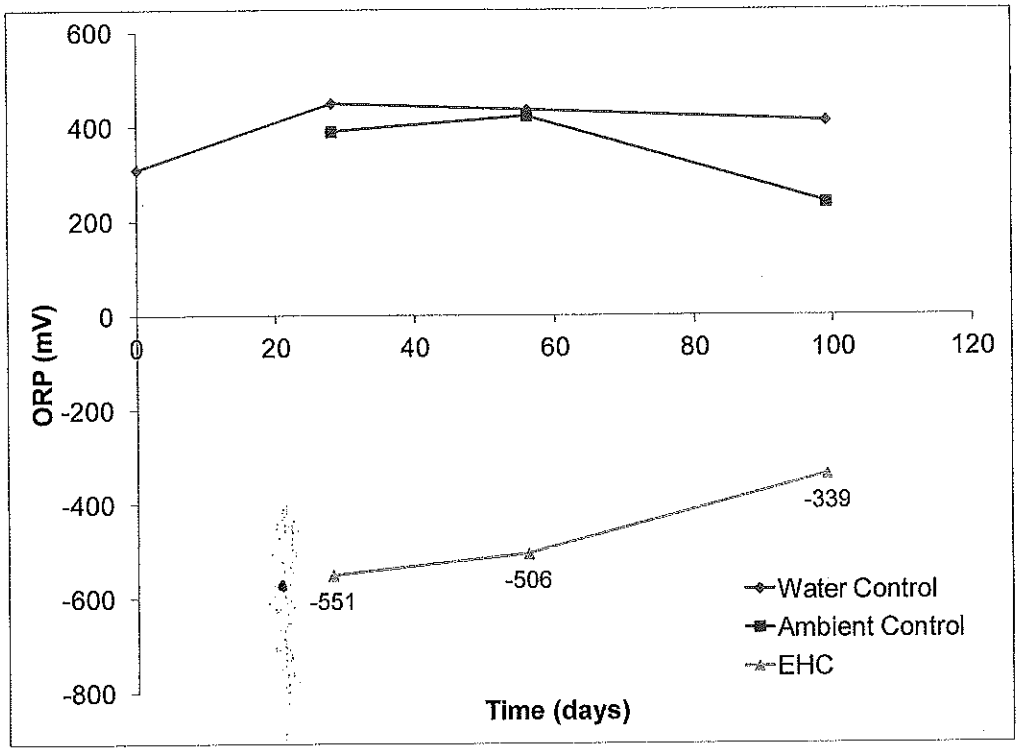


Figure 3: Groundwater ORP values over time

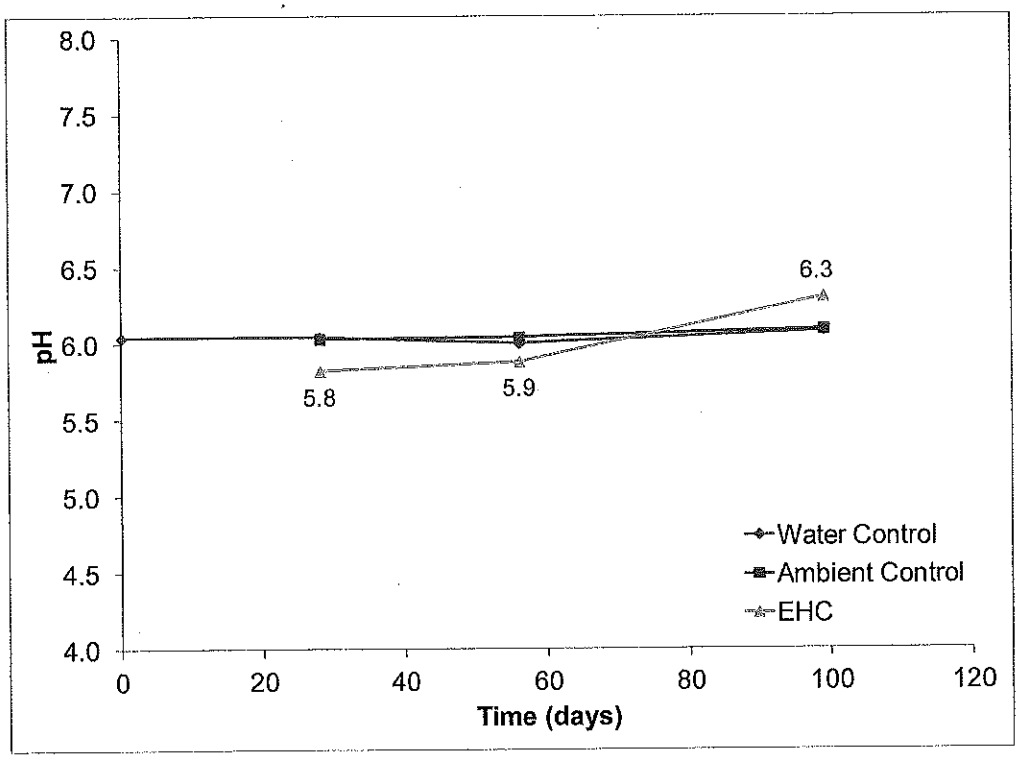


Figure 4: Groundwater pH values over time

5. SUMMARY

The purpose of this bench study was to evaluate EHC for the treatment of cVOCs in groundwater and soil from the Formosa Plastics Site in Point Comfort, Texas. The following summary is provided based on the results presented herein:

- The initial characterization of the Site groundwater revealed that the groundwater was impacted with 1,554,800 µg/L of VOCs. The main VOCs detected were: CF (100,000 µg/L) and 1,2-DCA (1,400,000 µg/L).
- The soil sample was impacted with 40,312 µg/kg of VOCs. The CF and 1,2-DCA concentrations were 1,700 µg/kg and 38,000 µg/kg, respectively.
- The composite groundwater was slightly acidic (pH = 6.41) and oxic (ORP = +51 mV). The homogenized soil had a pH of 7.8.
- The EHC treatment supported reductions in CF and other VOCs (1,1,2-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, PCE, trans-1,2-DCE, TCE, VC) over time, however, little reductions in 1,2-DCA were observed.
- On days 28, 56 and 99, 10%, 15% and 34% reductions in 1,2-DCA were supported in the EHC treatment when compared to the ambient control, respectively.
- Bioaugmentation of the EHC microcosm with a commercially available mixed culture (SDC-9 (*Dehalococcoides*) and TCA-20 (*Dehalobacter*); The Shaw Group) did not have an effect on the treatment of 1,2-DCA.

APPENDIX D

Gainco Report – Multi-Phase Extraction

GAINCO
ENVIRONMENTAL REMEDIATION

P.O. Box 309, Portland, Texas 78374
Phone 361-643-4378 Fax 866-306-0436

January 15, 2013

Mr. Matt Wickham, PG
Pastor, Behling & Wheeler, LLC
620 E. Airline
Victoria, TX 77901

Re: Mass Removal Pilot Testing
Formosa Plant
Point Comfort, TX

Dear Mr. Wickham,

This letter transmits the results of the Soil Vapor Extraction (SVE), aquifer pump test, and Dual Phase Extraction (DPE) pilot testing conducted at the above referenced project site on October 10 and 11, 2012.

PILOT TEST MONITORING POINT INSTALLATION

Prior to conducting the mass removal pilot test, a 2-inch diameter PVC temporary well, TS-2, was installed in the near vicinity of wells P-57 (the pilot test extraction well), P-56, and RS-6.

Information provided indicated the thin upper groundwater zone extends from approximately 12 to 14 feet (ft.) below ground surface (bgs). Based on this information and actual conditions encountered, temporary well TS-2 was installed to approximately 15 ft. bgs and screened from 10-15 ft. bgs in order to fully penetrate this upper zone. Upon completion of pilot testing, the temporary well was properly plugged by pulling the well casing and screen and grouting with bentonite/cement.

PILOT TESTING

The purpose of the pilot test was to determine if either SVE or high vacuum DPE technology is suitable for this site. The test apparatus consisted of a liquid ring pump connected to a 1-inch diameter PVC pipe (stinger) inserted into the extraction well.

The pilot test was conducted over 2 days, with the SVE and baseline groundwater extraction data collected the first day and high vacuum DPE data collected the second day, as briefly described below.

- Stage 1: With the stinger placed approximately 9-10 ft above the groundwater level and the annular area between the stinger and the well casing sealed, baseline SVE data was collected. SVE testing was conducted in step fashion (SVE Step Test) at vacuums of approximately 6 inches (in.) of water column (w.c.), 50 in. w.c., and 200 in. w.c.. This short duration test provided a baseline for mass removal using SVE only.
- Stage 2: Following SVE testing, the stinger was lowered to the proximity of the bottom of the extraction well with the annular area open. This short duration test provided baseline groundwater extraction data.

- Stage 3: Following the first two stages of testing, the crew demobilized for the day to allow the groundwater and in-situ soil vapor to recover to static conditions. The following day, high vacuum DPE testing was conducted by sealing the annular area with the stinger below the groundwater level, resulting in a data set for comparison to the two baseline data sets of conventional SVE and conventional groundwater extraction.

During the testing, the following parameters were recorded.

- Groundwater recovery rate
- Soil vapor recovery rate and temperature of recovered vapor at the flow measurement point
- Wellhead vacuum at the selected test-well and monitoring points
- Depth to water in the selected monitoring points
- Volatile hydrocarbons of the extracted soil vapor (via a photoionization detector [PID])

A summary of the testing, data collection, and data analysis is presented below.

Stage 1 – Conventional SVE Testing

The SVE Step test was conducted from well P-57 at three discrete vacuum levels of approximately 6 in. w.c., 50 in. w.c., and 200 in. w.c.. Each Step was sustained for 30 minutes. Subsurface vacuum readings were taken at wells P-56 and TS-2. The SVE data was analyzed to determine soil vapor flow rates, mass removal rates, and radial influence and is presented in Attachment 1. A graphical summary of the vacuum data is shown in Figure 1 below.

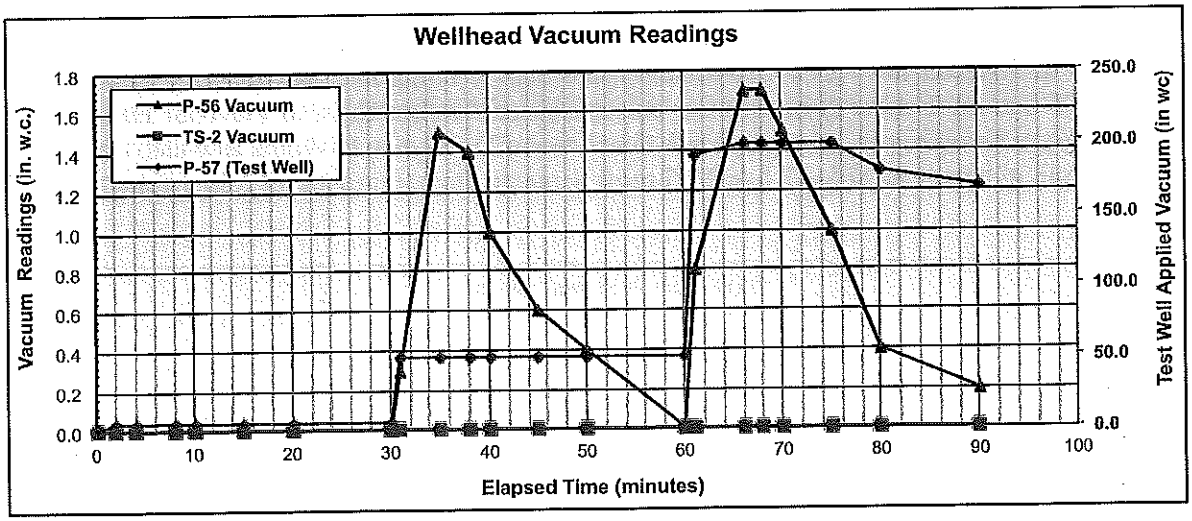


Figure 1: SVE Vacuum Data

During the test, PID readings were taken of the extracted vapor prior to carbon treatment (the recovered vapor was treated with carbon prior to emission). At the point of obtaining PID readings, temperature and velocity data were also taken to facilitate calculation of hydrocarbon mass removal. During the short-term SVE test, an estimate of 0.035 lbs of hydrocarbons were extracted during the first Step (30 minutes) for an average recovery rate of 0.070 lbs/hr. No hydrocarbon mass was extracted during Steps 2 or 3, as the vacuum appeared to have raised the groundwater above the well screen, thereby preventing soil vapor flow into the well casing. SVE

flow was determined by anenometer readings at the stack and the "bleed air" inlet pipe. Flow was taken as zero when the difference between these values was zero or negative. In such cases, based on potential margin of error, actual flow rates may vary; however, the flow is considered negligible, thus resulting in zero mass removal (by calculation).

A summary of the extraction flow rates and mass removal data is presented in Table 1.

Table 1: SVE Test Data

Testing Stage	Sample Time (min.)	Analysis Type	Flow (Q) (scfm)	TPH / VOCs Concentration (mg/m^3)	TPH / VOCs Emission Rate (lbs/hr)	Total Recovery Per Stage (lbs)	Total Recovery Cumulative (lbs)
Vapor Phase Recovery							
SVE Step 1	0	Est.	2.5	7,511	0.07	0.000	0.000
	20	PID	2.5	7,511	0.07	0.023	0.023
	30	Est.	2.5	7,511	0.07	0.012	0.035
				Step 1 Subtotal	**0.07**	**0.035**	
SVE Step 2	31	Est.	0.0	11,468	0.00	0.000	0.035
	38	PID	0.0	10,603	0.00	0.000	0.035
	60	PID	0.0	7,886	0.00	0.000	0.035
				Step 2 Subtotal	**0.00**	**0.000**	
SVE Step 3	61	Est.	0.0	8,427	0.00	0.000	0.035
	80	PID	0.0	7,378	0.00	0.000	0.035
	90	PID	0.0	6,826	0.00	0.000	0.035
				Step 3 Subtotal	**0.00**	**0.000**	
				SVE Step Test Total	**n/a**	**0.035**	

Stage 2 – Conventional Groundwater Extraction Test

To provide a baseline from which groundwater recovery via DPE could be compared, conventional groundwater extraction testing was conducted at P-57. In addition to obtaining groundwater recovery data, drawdown measurements were taken at wells P-56 and TS-2. The drawdown data was analyzed using the Cooper-Jacob Approximation as presented in Attachment 2. A drawdown plot for measurements obtained from P-56 and TS-2 is presented in Figure 2.

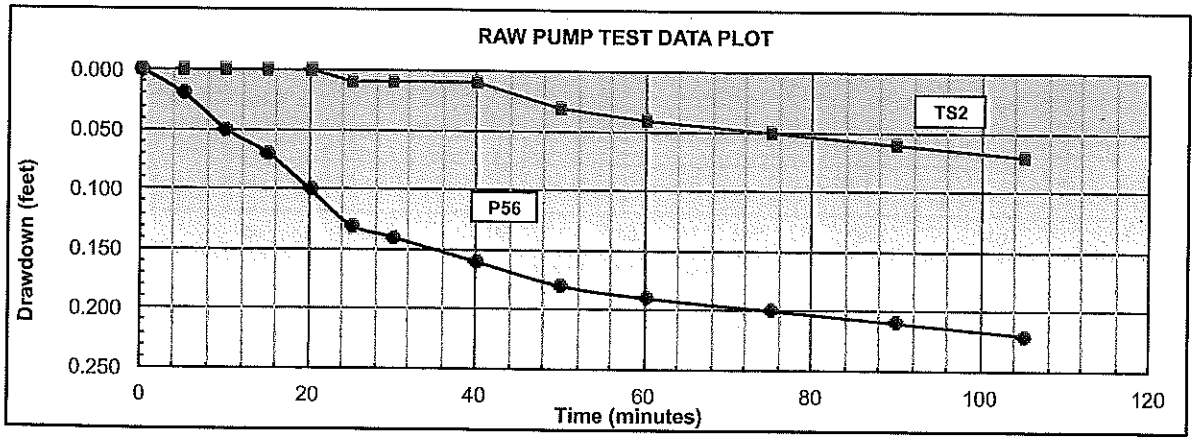


Figure 2: Pump Test Drawdown Data

Based on the Cooper-Jacob analysis, the average hydraulic conductivity was 38 ft/day ($1.34x10^2$ cm/sec). A summary of the analysis is presented in Table 2.

Table 2: Pump Test Data

Piezometer	Q (gpm)	s_{log} (feet)	r (feet)	t_o (min)	t_o (days)	T (gpd/ft)	T (ft^2/day)	S	K (ft/day)
P56	0.57	0.152	8.4	3.1	2.15E-03	991	132	0.0091	34
TS2	0.57	0.123	26.8	26	1.81E-02	1,224	164	0.0093	42
					Avg.	1,108	148	0.0092	38
								K (cm/sec)	1.34E-02

Based on the pilot test data, an average pumping rate of 0.57 gallons per minute (gpm) was achieved during the short-term 105 minute test. The Cooper-Jacob analysis indicated a long-term well yield of approximately 15 gallons per day could be achieved.

Stage 3 – High Vacuum DPE Test

The DPE test was conducted from well P-57 at a vacuum of approximately 200 in. w.c. with the stinger inserted approximately 15 ft bgs (near the bottom of the well) and the annular area between the stinger and the well casing sealed.

The groundwater extraction rate ranged from an initial value of approximately 2.5 gpm to a final value of 0.42 gpm after 6 hours of testing as shown in Figure 3.

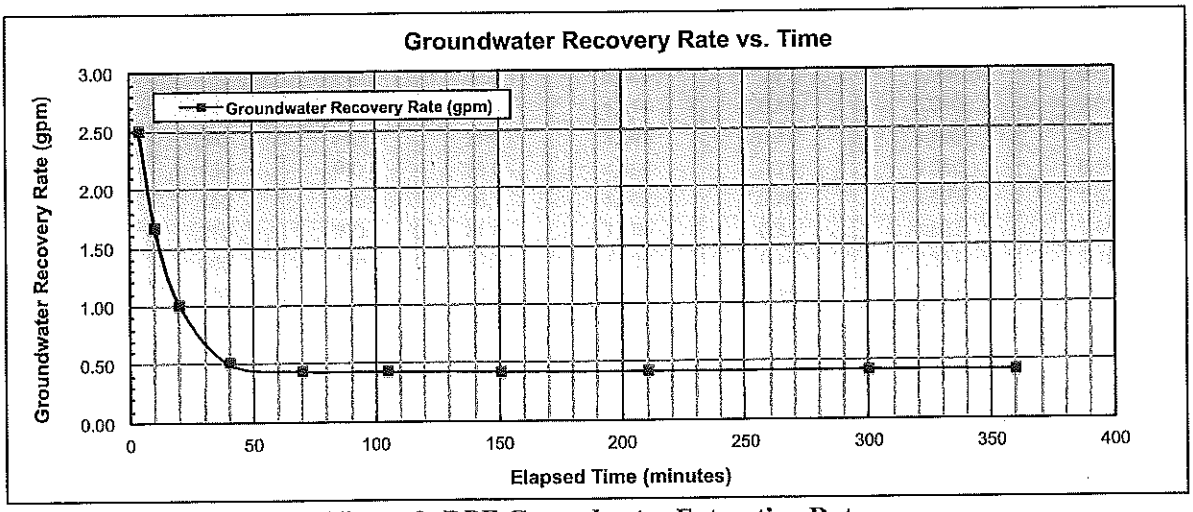


Figure 3: DPE Groundwater Extraction Data

Subsurface vacuum readings were taken at wells P-56 and TS-2. The DPE data was analyzed to determine groundwater extraction rates, soil vapor flow rates, mass removal rates, and radial influence and presented in Attachment 3. A graphical summary of the vacuum data is shown in Figure 4 below.

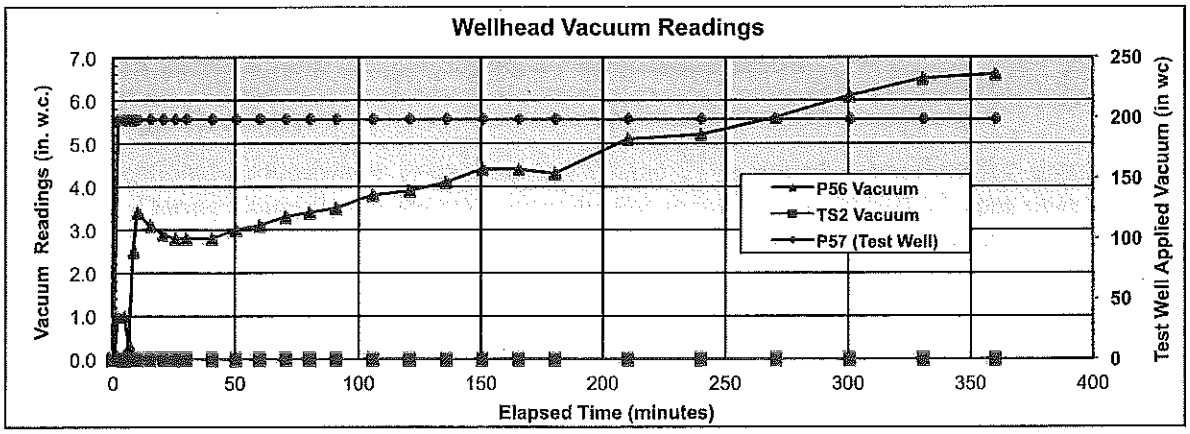


Figure 4: DPE Vacuum Data

During the test, PID readings and samples for laboratory analysis were taken of the extracted vapor prior to carbon treatment of the emissions. An estimate of 4.98 lbs of hydrocarbons were extracted during the 6-hour test for an average recovery rate of 0.83 lbs/hr. A summary of the extraction flow rates and mass removal data is presented in Table 3.

Table 3: DPE Test Data

Sample Time (min.)	Sample Time (min.)	Analysis Type	Flow (Q) (scfm)	EDC Concentrations		Total Recovery	
				Concentration (mg/m^3)	Emission Rate (lbs/hr)	Per Stage (lbs)	Cumulative (lbs)
Vapor Phase Recovery							
DPE Testing Stage	0	n/a	0.0	0	0.00	0.000	0.000
	2	PID	9.3	6,406	0.22	0.004	0.004
	4	Lab	9.5	4,114	0.15	0.010	0.014
	40	PID	11.6	3,998	0.17	0.106	0.119
	120	PID	15.6	4,308	0.25	0.389	0.508
	150	Lab	16.1	4,803	0.29	0.525	1.033
	210	PID	21.2	3,866	0.31	0.823	1.857
	300	Lab	22.8	4,636	0.40	1.351	3.207
	360	Est.	23.0	5,149	0.44	1.771	4.978
DPE Average Soil Vapor Extraction Rate >>					0.83		

As indicated in Table 3, three samples of the extracted soil vapor (at 4 minutes, 150 minutes, and 300 minutes) were obtained and shipped to AnalySys Inc. located in Corpus Christi, Texas for laboratory analyses. All samples were submitted for determination of 1,2-Dichloroethane (also known as ethylene dichloride [EDC]) and total petroleum hydrocarbon (THP) concentrations. Laboratory results for EDC indicated vapor concentrations ranged from approximately 985 to 1,150 ppm (4,114 to 4,803 milligrams per cubic meter [mg/m^3]) and TPH concentrations ranged from approximately 2,400 to 9,860 mg/m^3. The soil vapors exhibited a relatively stable EDC concentration; while the TPH concentration steadily declined with time. A copy of the certified laboratory report and chain of custody documentation is presented in Attachment 4.

CONCLUSSIONS

Conclusions gathered from the pilot testing are summarized below.

Groundwater Recovery

The conventional groundwater extraction test (Stage 2) provided a baseline for groundwater recovery. During Stage 2, the average groundwater recovery rate was 0.57 gpm over the 105 minute test. During Stage 3, the average groundwater recovery rate was 0.49 gpm. Comparing the first 105 minutes of each test (the duration of Stage 2), the average groundwater recovery rate was 0.57 gpm for conventional recovery (Stage 2) and 0.65 gpm for DPE (Stage 3).

Soil Vacuum Radius of Influence

For the SVE and DPE testing, the radius of influence (ROI) of in-situ subsurface vacuum was estimated. In each case, the vacuum at the observation points was plotted as raw data and as normalized data (recorded vacuum divided by the vacuum at the extraction well).

The raw data plot is provided primarily as information purposes (see attachments), as the normalized plots are preferred in ROI estimates. The ROI plots are provided below in Figures 5 and 6. The ROI is taken as the point at which the normalized subsurface vacuum is at or greater than 0.01. The normalized ROI for SVE and DPE testing was 7.5 ft. and 11.5 ft., respectively. This indicates a 53% increase in ROI for DPE relative to conventional SVE.

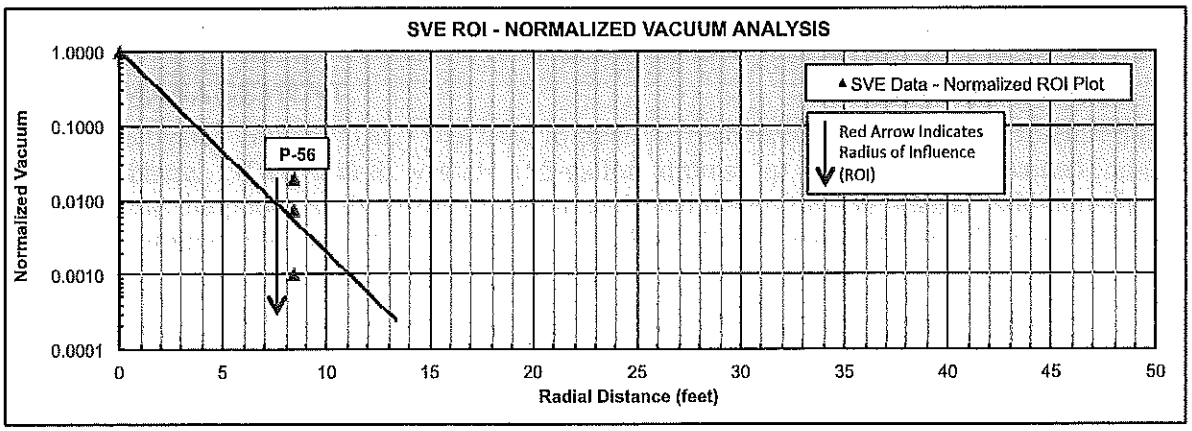


Figure 5: SVE ROI using Normalized Vacuum Data

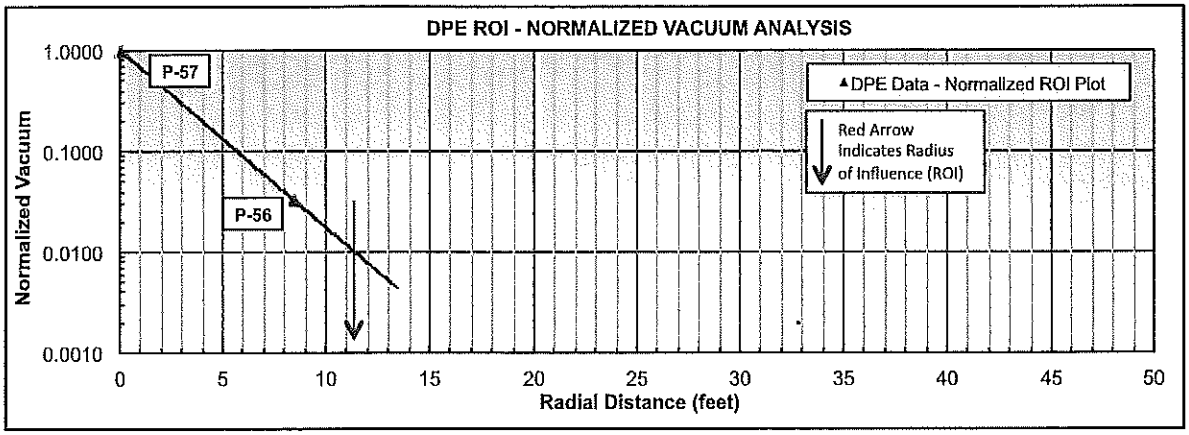


Figure 6: DPE ROI using Normalized Vacuum Data

Hydrocarbon Mass Removal

The clearest indicator of remediation effectiveness is the extraction rate of hydrocarbons. As the data indicates, the extraction rate was lowest when only SVE was employed (0.07 lb/hr) and was significantly higher when the system was operated in high vacuum DPE mode (0.83 lb/hr). The primary contaminant at the project site is EDC. The volatility of EDC makes it a viable candidate for remediation via DPE. Although, the low permeability soil reduces the overall influence of vapor phase recovery, DPE remains a viable remedial technique for this site due to the high vapor phase mass removal recorded during the pilot test.

WASTE MANAGEMENT

Granular activated carbon (GAC) was used to treat the recovered soil vapor prior to emitting to the atmosphere. Two 200-lb vessels (55-gallon drums) of spent GAC remained on-site subsequent to the pilot test for characterization and final disposition by others. Additionally, all recovered groundwater was transferred to 55-gallon drums and removed from the site by Formosa plant personnel to be incorporated into the plant waste management program.

If you have any questions, please contact me at 210-669-8941 (tweber@gaincoinc.com) or Stas Grover at 210-296-5298 (email: sgrover@gaincoinc.com).

Sincerely,

Tom J Weber, PE
Gainco, Inc.

GAINCO
ENVIRONMENTAL REMEDIATION

Attachment 1
SVE Data and Analysis

PILOT TEST ANALYSIS WORKSHEETS

SVE STEP TEST
FIELD DATA WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

Step ID	Elap. Time (min.)	Liquid Ring Pump Vacuum (in. Hg)	Liquid Ring Pump Flow (scfm)	System Effluent Carbon Treatment Flow (scfm)	PID (ppm)	PID (mg/m^3)	Test Well Vacuum P57 Vacuum (in wc)	Monitor Point Vacuum P56 Vacuum (in wc)	P56 Norm. (---)	TS2 Vacuum (in wc)	TS2 Norm (---)
Step 1 SVE	0	21	2	65			0.0	0.0	0.000	0.0	0.000
	2	21	2	65			5.9	0.0	0.000	0.0	0.000
	4	21	2	65			5.9	0.0	0.000	0.0	0.000
	8	21	2	65			5.9	0.0	0.001	0.0	0.000
	10	21	2	65			5.9	0.0	0.000	0.0	0.000
	15	21	2	65			5.9	0.0	0.000	0.0	0.000
	20	21	2	65	1798	7511	5.9	0.0	0.000	0.0	0.000
	30	21	2	65			5.9	0.0	0.000	0.0	0.000
Step 2 SVE	31	22	0	45			51	0.3	0.006	0.0	0.000
	35	22	0	45			51	1.5	0.030	0.0	0.000
	38	22	0	45	2539	10603	51	1.4	0.027	0.0	0.000
	40	22	0	46			51	1.0	0.020	0.0	0.000
	45	22	2	48			51	0.6	0.012	0.0	0.000
	50	22	0	49			51	0.4	0.008	0.0	0.000
	60	22	0	52	1888	7886	51	0.0	0.000	0.0	0.000
Step 3 SVE	61	25	0	25			192	0.8	0.004	0.0	0.000
	66	25	0	25			199	1.7	0.009	0.0	0.000
	68	25	0	25			199	1.7	0.009	0.0	0.000
	70	25	0	25			199	1.5	0.008	0.0	0.000
	75	25	0	26			199	1.0	0.005	0.0	0.000
	80	25	0	26	1767	7378	180	0.4	0.002	0.0	0.000
	90	25	0	27	1634	6826	170	0.2	0.001	0.0	0.000
				Dist. from Extraction Well >>			0 ft.	8.4 ft.		26.8 ft.	

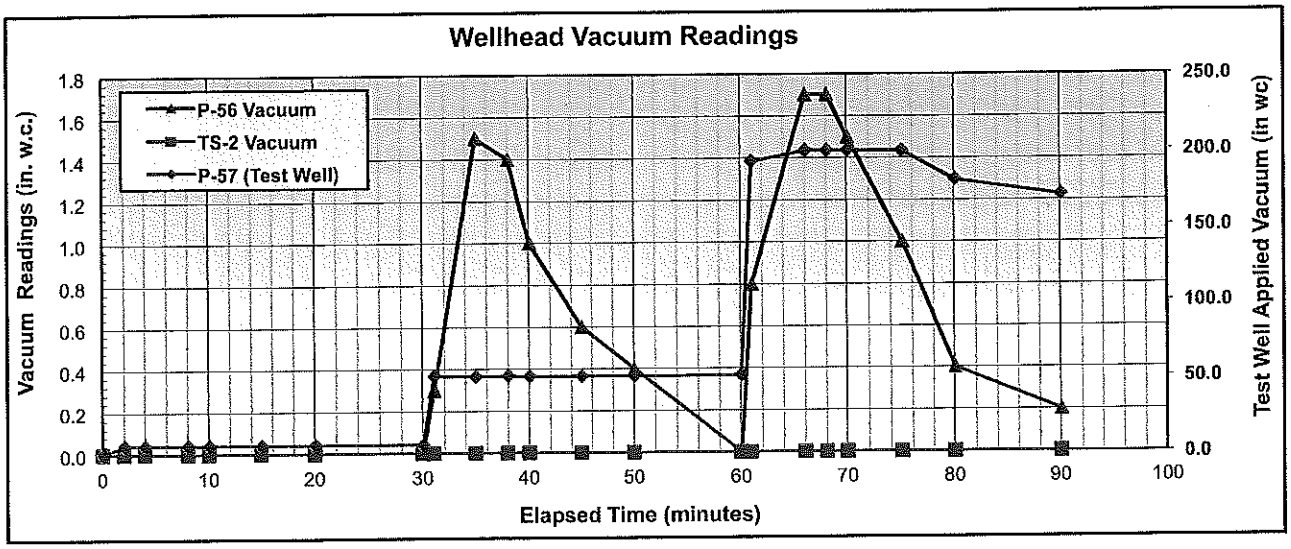
Notes:

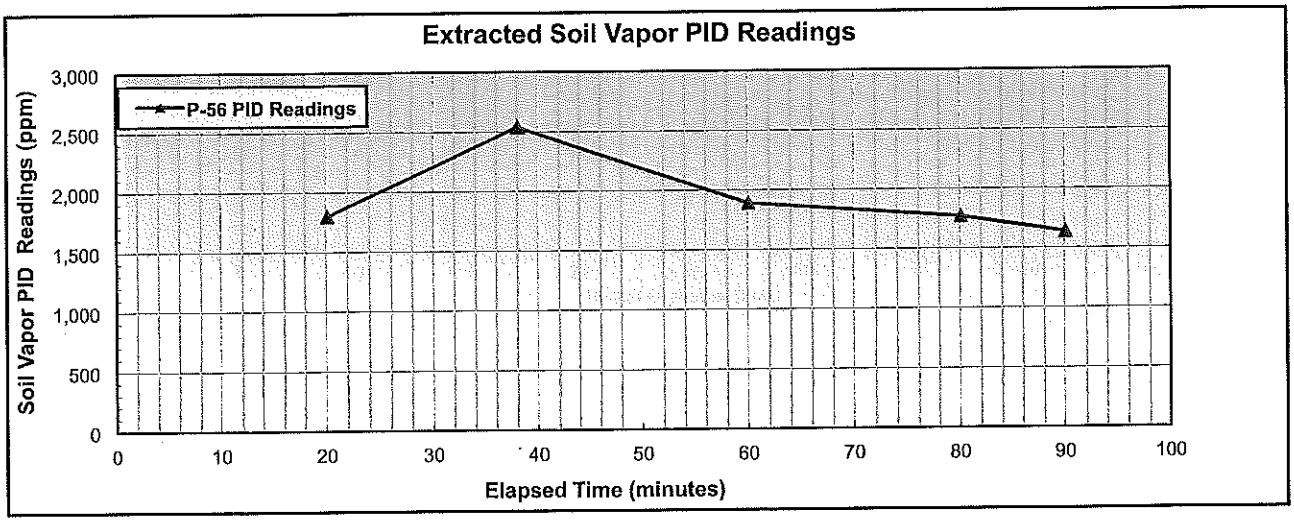
1. Shaded cells indicate values that were utilized in the raw and normalized ROI plots.
2. SVE flow was determined by anenometer readings at the stack and the "bleed air" inlet pipe, converting each to standard volumetric flow based on pipe diameter and temperature. Flow was taken as zero when the difference was zero or negative. In such cases, based on potential margin of error, actual flow rates may vary; however, the flow is considered negligible.
3. Analyses indicated as PID were obtained by field screening with a photoionization detector.
4. Concentrations in parts per million (ppm) were converted to milligrams per cubic meter (mg/m^3) using the molecular weight of ethylene dichloride, 98.96 lb/lb-mole.

PILOT TEST ANALYSIS WORKSHEETS

SVE STEP TEST
WELLHEAD VACUUM AND PID READINGS (SVE TEST ONLY)
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

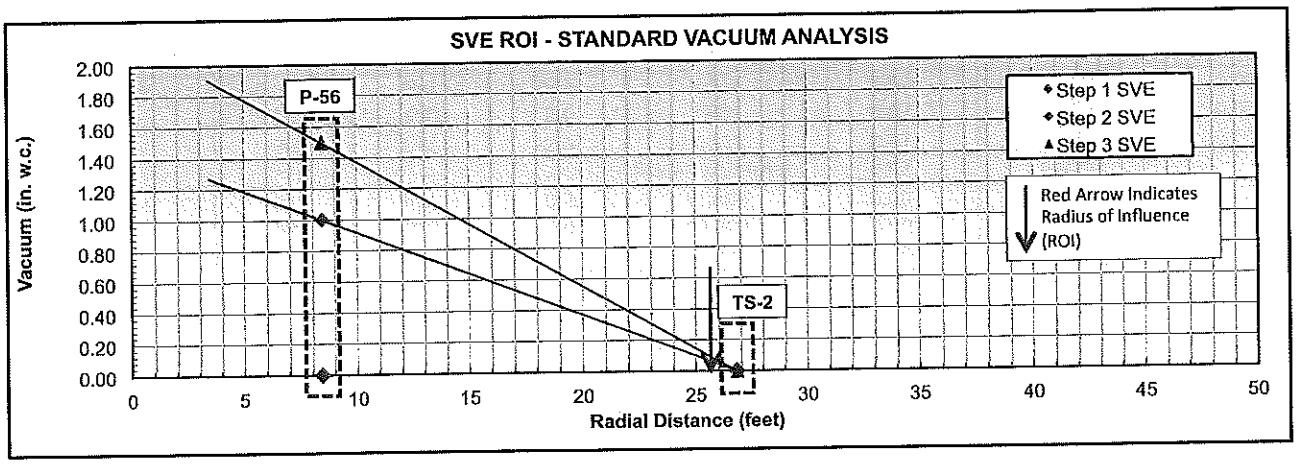


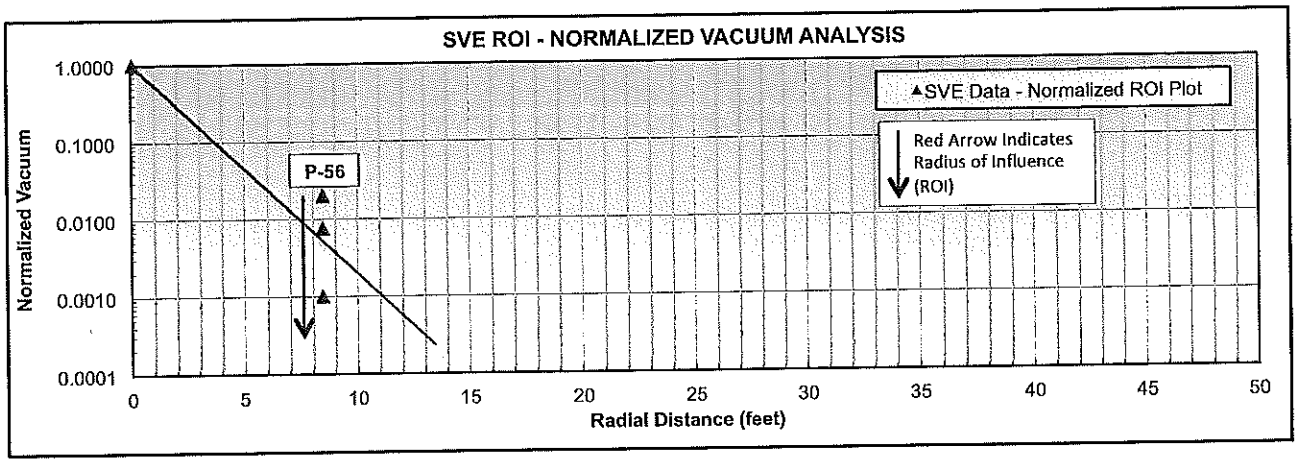


PILOT TEST ANALYSIS WORKSHEETS

Test Date: **10-Oct-12**
Test Well: **P57**

SVE STEP TEST
RADIUS OF INFLUENCE PLOTS
FORMOSA PLANT
POINT COMFORT, TX



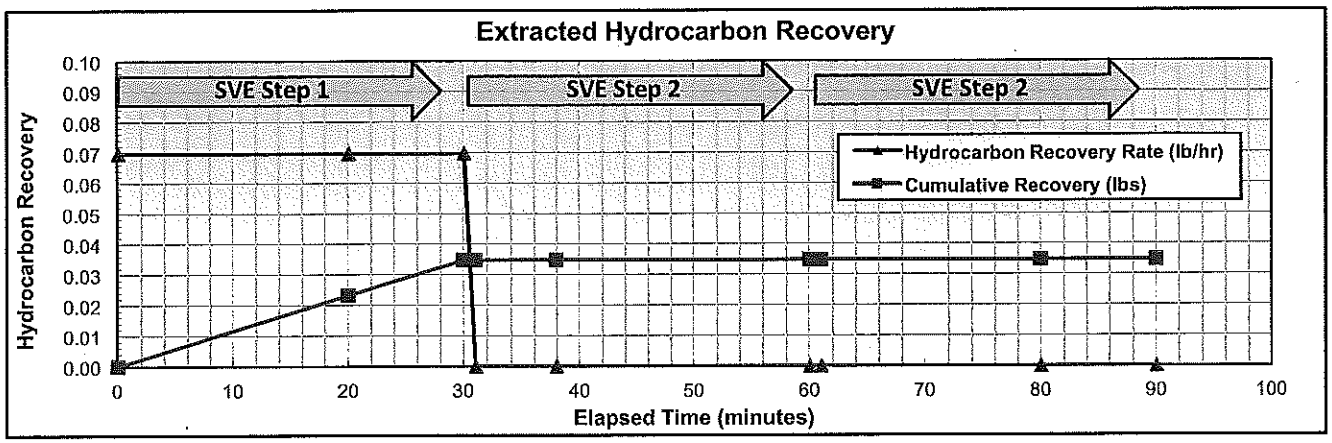


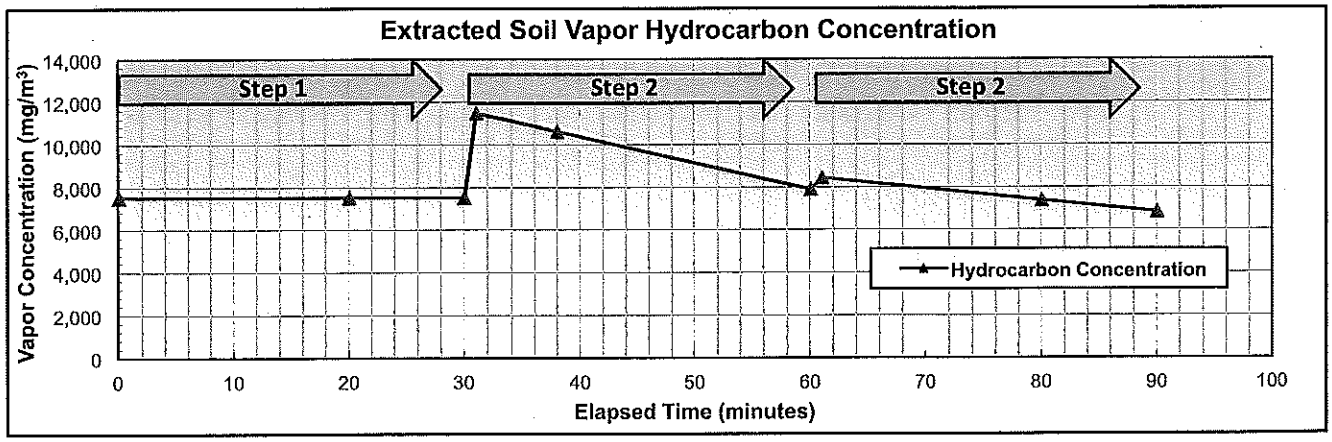
PILOT TEST ANALYSIS WORKSHEETS

SVE STEP TEST
VAPOR PHASE RECOVERY WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

Testing Stage	Sample Time (min.)	Analysis Type	Flow (Q) (scfm)	TPH / VOCs Concentration (mg/m^3)	TPH / VOCs Emission Rate (lbs/hr)	Total Recovery Per Stage (lbs)	Total Recovery Cumulative (lbs)
Vapor Phase Recovery							
SVE Step 1	0	Est.	2.5	7,511	0.07	0.000	0.000
	20	PID	2.5	7,511	0.07	0.023	0.023
	30	Est.	2.5	7,511	0.07	0.012	0.035
				Step 1 Subtotal	**0.07**	**0.035**	
SVE Step 2	31	Est.	0.0	11,468	0.00	0.000	0.035
	38	PID	0.0	10,603	0.00	0.000	0.035
	60	PID	0.0	7,886	0.00	0.000	0.035
				Step 2 Subtotal	**0.00**	**0.000**	
SVE Step 3	61	Est.	0.0	8,427	0.00	0.000	0.035
	80	PID	0.0	7,378	0.00	0.000	0.035
	90	PID	0.0	6,826	0.00	0.000	0.035
				Step 3 Subtotal	**0.00**	**0.000**	
				SVE Step Test Total	**n/a**	**0.035**	





GAINCO
ENVIRONMENTAL REMEDIATION

Attachment 2
Pump Test Data and Analysis

PO Box 309 • Portland, TX 78374 | Tel: 361.643.4378 | Fax: 866.306.0436
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PILOT TEST ANALYSIS WORKSHEETS

AQUIFER PUMP TEST
INITIAL vs. FINAL CONDITIONS
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

INITIAL STATIC WATER AND LNAPL LEVELS												
	Dist. From	Total	Casing	INITIAL CONDITIONS				FINAL CONDITIONS				Overall
Well	Ext. Well (feet)	Depth (feet)	Dia. (inch)	DTW (feet)	DTP (feet)	LNAPL (feet)	Adj. DTW (feet)	DTW (feet)	DTP (feet)	LNAPL (feet)	Adj. DTW (feet)	Difference (feet)
P57	0	17	6	14.40	---	0.00	14.40	18.00	---	0.00	18.00	3.60
P56	8.4	17	2	14.45	---	0.00	14.45	14.67	---	0.00	14.67	0.22
TS2	26.8	15	2	14.36	---	0.00	14.36	14.44	---	0.00	14.44	0.08

Note:
Pump test was conducted by applying a vacuum to a drop tube (stinger) set at 18 ft below top of casing with anular area unsealed (i.e., no vacuum applied to formation).

Test Date: October 10, 2010
Reference: Top of PVC
Extraction Well: P57 (6-inch diameter casing)
Type of Test: Conventional

Depth to Water Adjustment
When needed, the depth to water (DTW) is adjusted to account for the presence of LNAPL using the following equation

$$DTW_{adj} = DTW - 0.72(DTW - DTP)$$

Where:

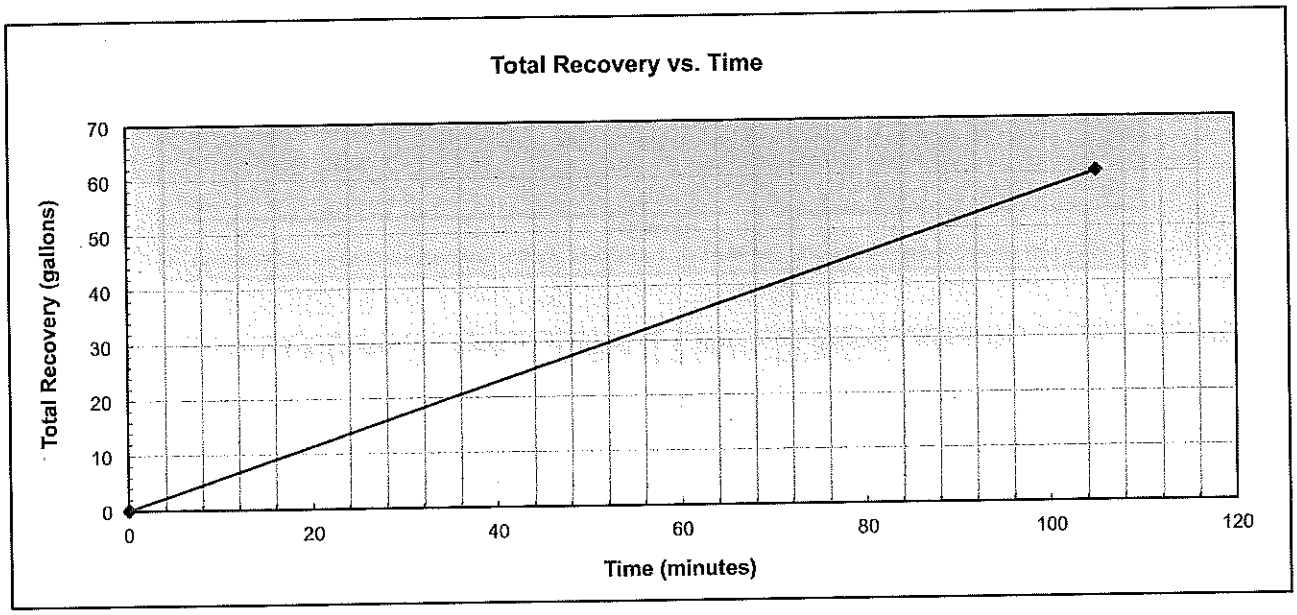
DTW : *Depth to water measured from the top of the well casing*
DTP : *Depth to LNAPL measured from the top of the well casing*
DTW_{adj} : *Depth to water adjusted for LNAPL (s.g. = 0.72) thickness referenced from the top of the well casing.*
LNAPL: *Light non-aqueous liquid*

PILOT TEST ANALYSIS WORKSHEETS

Test Date: **10-Oct-12**
Test Well: **P57**

AQUIFER PUMP TEST
FLOW RATE DATA
FORMOSA PLANT
POINT COMFORT, TX

Time (minutes)	Rate (gpm)	Incremental Total (gallons)	Total Recovery (gallons)
0	---	---	0
105	0.57	60	60
		Total (gallons)	**60**
		Time Weighted Average (gpm)	**0.57**



PILOT TEST ANALYSIS WORKSHEETS

AQUIFER PUMP TEST
DATA ANALYSIS WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

$$T = \frac{2.30\,Q}{1440 \cdot 4\pi \cdot s_{log}} \qquad S = \frac{2.25\,T\,t_0}{7.481 \cdot r^2} \qquad Q = \frac{4\pi}{2.30} * \frac{T\,s}{\mathrm{Log}\left(\frac{2.25\,T\,t}{r^2\,S}\right)}$$

$$K = \frac{T}{7.481 \cdot b}$$

Cooper - Jacob Approximation
(consistent units)

T = Transmissivity (gpd/ft)
S = Storage Coefficient (unitless)
Q = Pumping Rate (gpm)
K = Hydraulic Conductivity (ft/day)
t_0 = time value at intersection of straight line with zero drawdown (days)
S_{log} = drawdown indicated by straight line over one log cycle (ft)
r = distance from piezometer to pumping well (ft)
b = apparent aquifer thickness (ft)

Reference
Driscoll, Fletcher G. Groundwater and Wells 2nd Edition. St. Paul, MN: Johnson Filtration Systems Inc., 1986.

Piezometer	Q (gpm)	s_{log} (feet)	r (feet)	t_o (min)	t_o (days)	T (gpd/ft)	T (ft^2/day)	S	K (ft/day)
P56	0.57	0.152	8.4	3.1	2.15E-03	991	132	0.0091	34
TS2	0.57	0.123	26.8	26	1.81E-02	1,224	164	0.0093	42
					Avg.	**1,108**	**148**	**0.0092**	**38**
								K (cm/sec)	**1.34E-02**

Well Bore Radius (feet)	0.58
Max. available drawdown (feet)	3.90
Estimated Max. Well Yield (ft^3/day)	**2.72**
Estimated Max. Well Yield (gpm)	**0.01**
Estimated Max. Well Yield (gpd)	**20**

PILOT TEST ANALYSIS WORKSHEETS

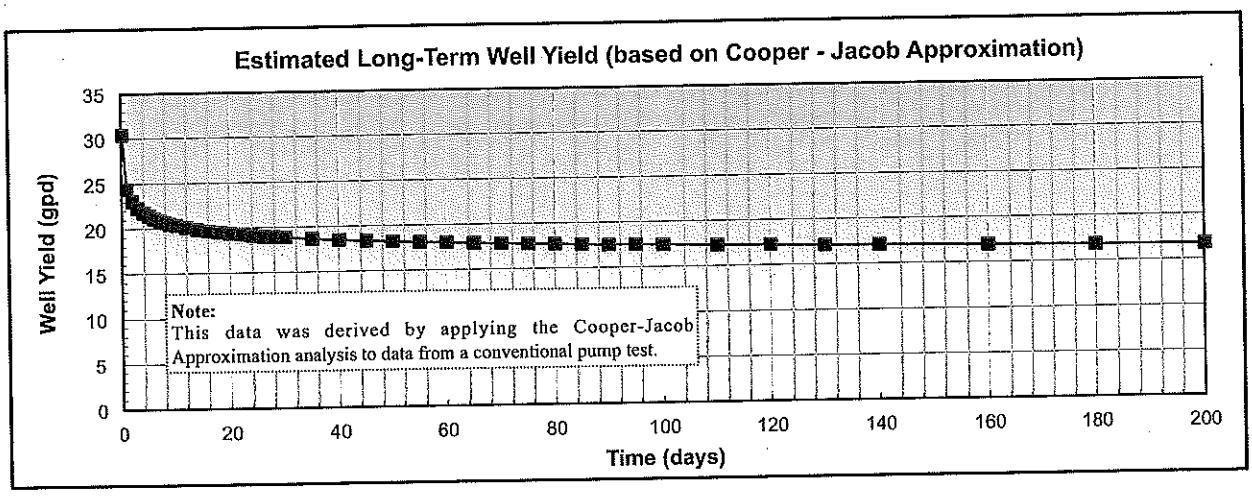
AQUIFER PUMP TEST
DATA ANALYSIS WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

$$Q = \frac{4\pi}{2.30} * \frac{T\,s}{\mathrm{Log}\left(\frac{2.25\,T\,t}{r^2\,S}\right)}$$

Time (day)	Well Yield (Q)		
	(ft^3/day)	(gpm)	(gpd)
0.1	4.07	0.02	30.44
1	3.26	0.02	24.39
2	3.08	0.02	23.01
3	2.98	0.02	22.27
4	2.91	0.02	21.78
5	2.86	0.01	21.41
6	2.82	0.01	21.12
7	2.79	0.01	20.88
8	2.76	0.01	20.67
9	2.74	0.01	20.50
10	2.72	0.01	20.34
12	2.68	0.01	20.08
14	2.65	0.01	19.86
16	2.63	0.01	19.67
18	2.61	0.01	19.51
20	2.59	0.01	19.37
22	2.57	0.01	19.25
24	2.56	0.01	19.13
26	2.54	0.01	19.03
28	2.53	0.01	18.94
30	2.52	0.01	18.85

Time (day)	Well Yield (Q)		
	(ft^3/day)	(gpm)	(gpd)
35	2.49	0.01	18.66
40	2.47	0.01	18.49
45	2.45	0.01	18.35
50	2.44	0.01	18.23
55	2.42	0.01	18.12
60	2.41	0.01	18.01
65	2.40	0.01	17.92
70	2.38	0.01	17.84
75	2.37	0.01	17.76
80	2.36	0.01	17.69
85	2.36	0.01	17.62
90	2.35	0.01	17.56
95	2.34	0.01	17.50
100	2.33	0.01	17.45
110	2.32	0.01	17.34
120	2.31	0.01	17.25
130	2.29	0.01	17.17
140	2.28	0.01	17.09
160	2.27	0.01	16.95
180	2.25	0.01	16.83
200	2.24	0.01	16.73



PILOT TEST ANALYSIS WORKSHEETS

AQUIFER PUMP TEST
MONITOR WELL DATA (MW-3)
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **10-Oct-12**
Test Well: **P57**

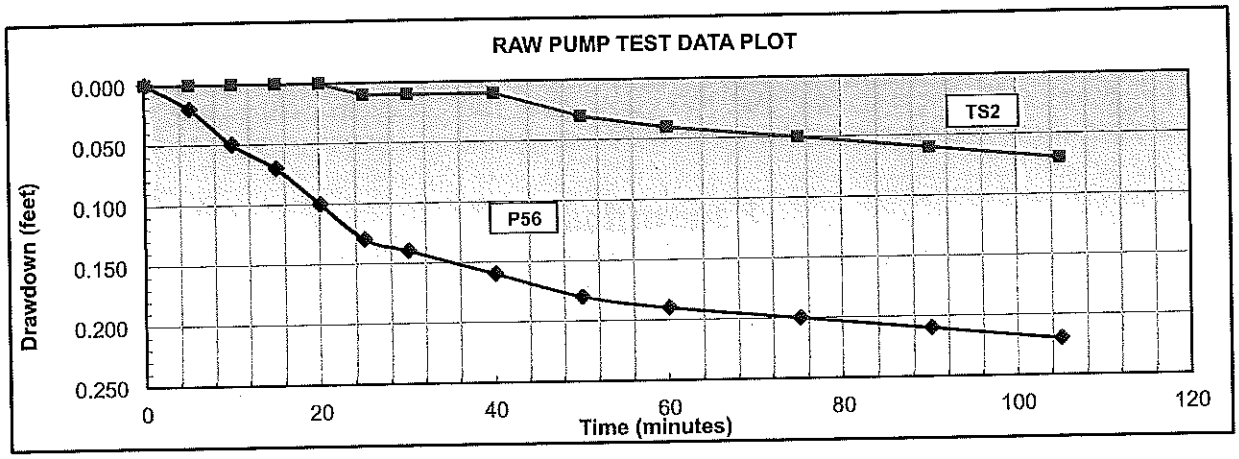
PUMP TEST DATA (11 Oct 2012)

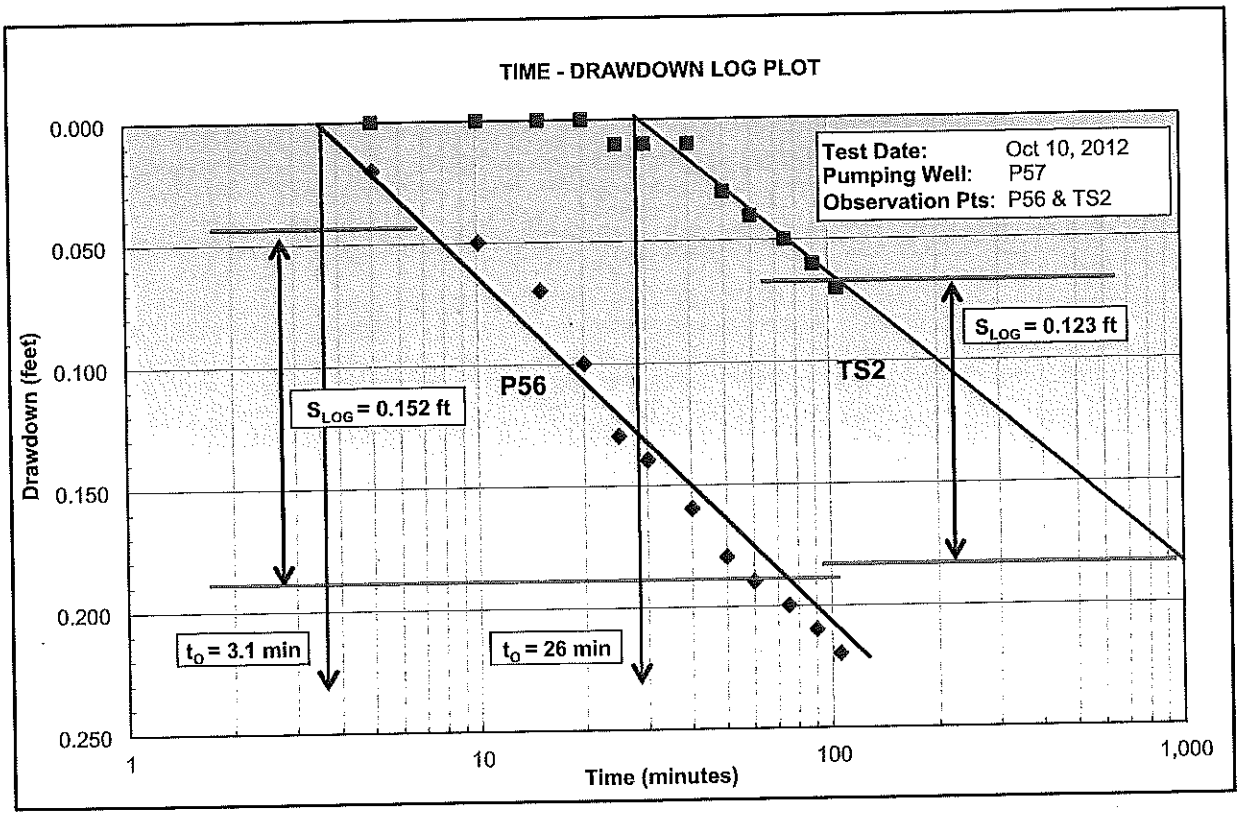
Test Date	Test Time	Elapsed Time (min)	Well P56		Well TS2	
			Depth to Water (ft.)	Draw-down (ft.)	Depth to Water (ft.)	Draw-down (ft.)
11-Oct-12	12:15	0	14.45	0.000	14.37	0.000
11-Oct-12	12:20	5	14.47	0.020	14.37	0.000
11-Oct-12	12:25	10	14.50	0.050	14.37	0.000
11-Oct-12	12:30	15	14.52	0.070	14.37	0.000
11-Oct-12	12:35	20	14.55	0.100	14.37	0.000
11-Oct-12	12:40	25	14.58	0.130	14.38	0.010
11-Oct-12	12:45	30	14.59	0.140	14.38	0.010
11-Oct-12	12:55	40	14.61	0.160	14.38	0.010
11-Oct-12	1:05	50	14.63	0.180	14.40	0.030
11-Oct-12	1:15	60	14.64	0.190	14.41	0.040
11-Oct-12	1:30	75	14.65	0.200	14.42	0.050
11-Oct-12	1:45	90	14.66	0.210	14.43	0.060
11-Oct-12	2:00	105	14.67	0.220	14.44	0.070

PILOT TEST ANALYSIS WORKSHEETS

Test Date: **10-Oct-12**
Test Well: **P57**

AQUIFER PUMP TEST
RAW AND ADJUSTED TIME-DRAWDOWN DATA PLOTS
FORMOSA PLANT
POINT COMFORT, TX





GAINCO
ENVIRONMENTAL REMEDIATION

Attachment 3
High Vacuum DPE Data and Analysis

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tnix@gaincoinc.com | www.gaincoinc.com

PILOT TEST ANALYSIS WORKSHEETS

Test Date: **11-Oct-12**
Test Well: **P57**

DPE PILOT TEST
FIELD DATA WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Elap. Time	Liquid Ring Pump		System Effluent Carbon Treatment					Test Well Vacuum	Monitor Point Vacuum			
								P57	P56		TS2	
	Vacuum	Flow	Flow	PID		EDC		Vacuum	Vacuum	Norm.	Vacuum	Norm
(min.)	(in. Hg)	(scfm)	(scfm)	(ppm)	(mg/m^3)	(ppm)	(mg/m^3)	(in wc)	(in wc)	(---)	(in wc)	(---)
0	0	0	0					0	0.0	0.0000	0.0	0.0000
2	28	9	9	1534	6406			199	1.0	0.0050	0.0	0.0000
4	28	10	10			985	4114	199	1.0	0.0050	0.0	0.0000
6	27	10	10					199	0.3	0.0015	0.0	0.0000
8	27	10	10					199	2.5	0.0126	0.0	0.0000
10	27	10	10					199	3.4	0.0171	0.0	0.0000
15	27	11	11					199	3.1	0.0156	0.0	0.0000
20	27	12	12					199	2.9	0.0146	0.0	0.0000
25	27	12	12					199	2.8	0.0141	0.0	0.0000
30	27	12	12					199	2.8	0.0141	0.0	0.0000
40	27	12	12	957	3998			199	2.8	0.0141	0.0	0.0000
50	27	12	12					199	3.0	0.0151	0.0	0.0000
60	27	13	13					199	3.1	0.0156	0.0	0.0000
70	27	13	13					199	3.3	0.0166	0.0	0.0000
80	27	14	14					199	3.4	0.0171	0.0	0.0000
90	27	14	14					199	3.5	0.0176	0.0	0.0000
105	27	15	15					199	3.8	0.0191	0.0	0.0000
120	27	16	16	1031	4308			199	3.9	0.0196	0.0	0.0000
135	27	16	16					199	4.1	0.0206	0.0	0.0000
150	27	16	16	1142	4771	1150	4803	199	4.4	0.0221	0.0	0.0000
165	27	17	17					199	4.4	0.0221	0.0	0.0000
180	27	19	19					199	4.3	0.0216	0.0	0.0000
210	27	21	21	926	3866			199	5.1	0.0256	0.0	0.0000
240	27	22	21					199	5.2	0.0261	0.0	0.0000
270	27	22	22					199	5.6	0.0281	0.0	0.0000
300	27	23	23	899	3755	1110	4636	199	6.1	0.0307	0.0	0.0000
330	27	23	23					199	6.5	0.0327	0.0	0.0000
360	27	23	23					199	6.6	0.0332	0.0	0.0000
						Dist. from Extraction Well >>		0 ft.	8.4 ft.		26.8 ft.	

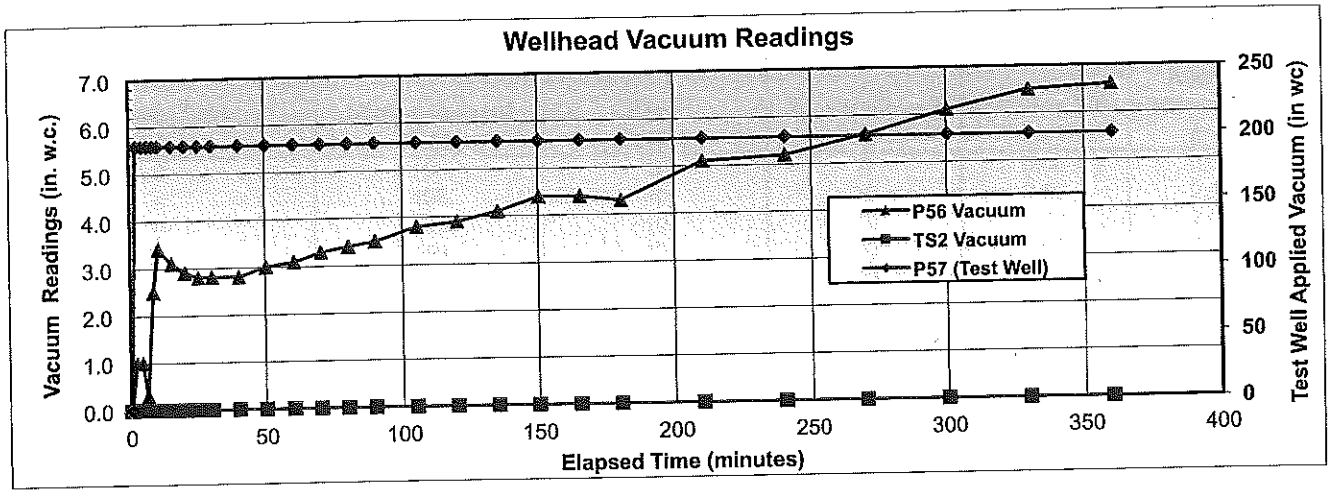
Notes:

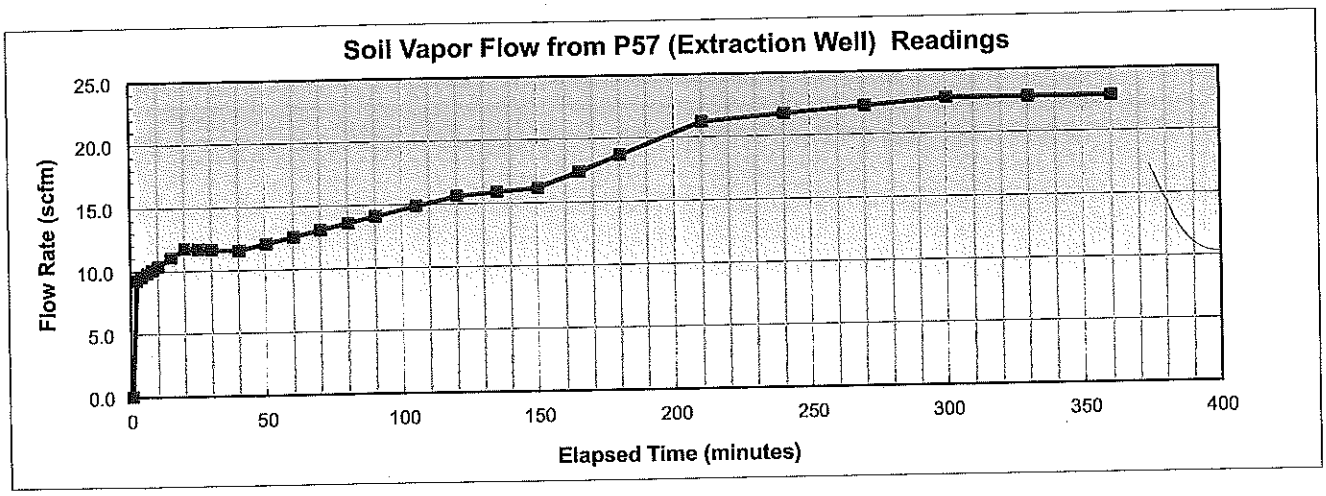
1. Shaded cells indicate values that were utilized in the raw and normalized ROI plots.
2. Analyses indicated as PID were obtained by field screening with a photoionization detector.
3. Analyses labeled as EDC indicate results of laboratory testing for Ethylene Dichloride.
4. Concentrations in parts per million (ppm) were converted to miligrams per cubic meter (mg/m^3) using the molecular weight of Ethylene Dichloride, 98.96 lb/lmole.

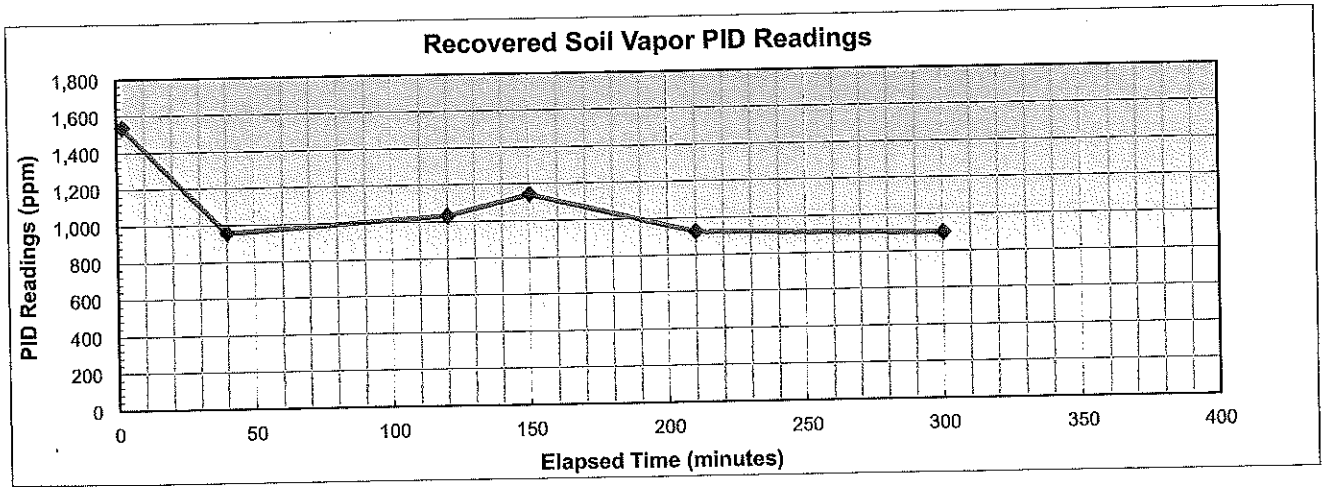
PILOT TEST ANALYSIS WORKSHEETS

Test Date: **11-Oct-12**
Test Well: **P57**

DPE PILOT TEST
WELLHEAD VACUUM AND PID READINGS (DPE TESTING)
FORMOSA PLANT
POINT COMFORT, TX





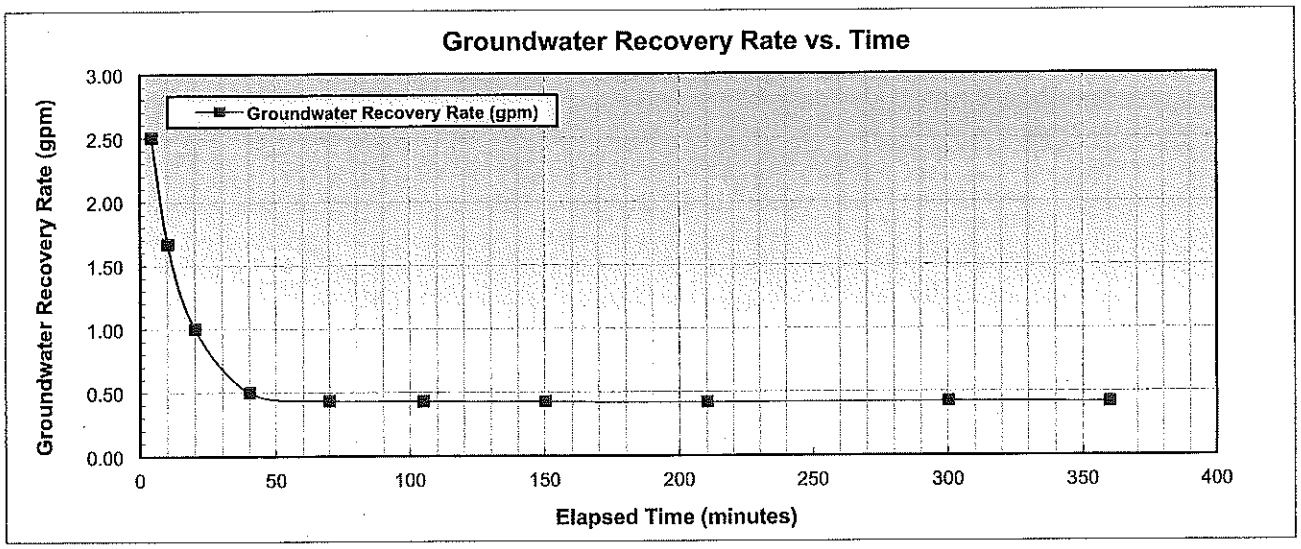


PILOT TEST ANALYSIS WORKSHEETS

DPE PILOT TEST
GROUNDWATER RECOVERY WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **11-Oct-12**
Test Well: **P57**

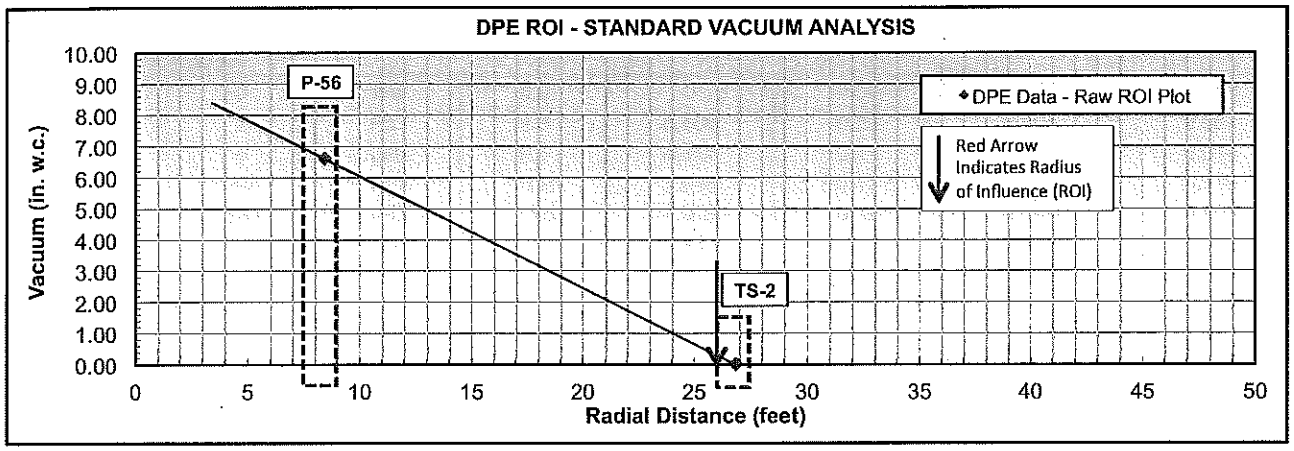
Elapsed Time (min.)	Extraction Well P57		Groundwater Recovery Data		
	Stinger Vacuum (in hg)	Flow (scfm)	Total Recovery (gallons)	Recovery Rate (gpm)	Average Recovery Rate (gpm)
0	0	0	0	0.00	0.00
4	199	10	10	2.50	2.50
10	199	10	20	1.67	2.00
20	199	12	30	1.00	1.50
40	199	12	40	0.50	1.00
70	199	13	53	0.43	0.76
105	199	15	68	0.43	0.65
150	199	16	87	0.42	0.58
210	199	21	112	0.42	0.53
300	199	23	150	0.42	0.50
360	199	23	175	0.42	0.49

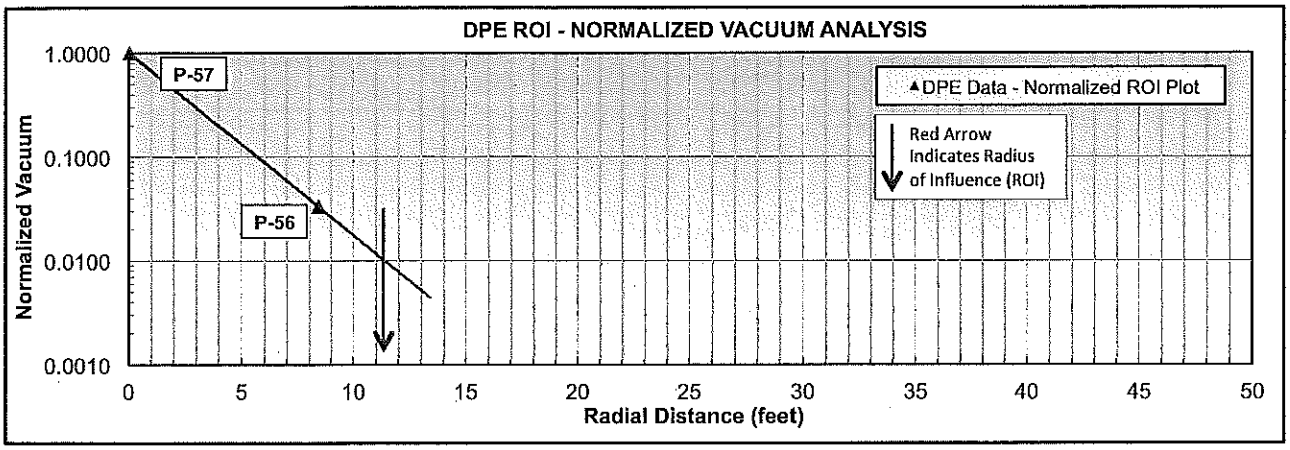


PILOT TEST ANALYSIS WORKSHEETS

DPE PILOT TEST
RADIUS OF INFLUENCE PLOTS
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **11-Oct-12**
Test Well: **P57**





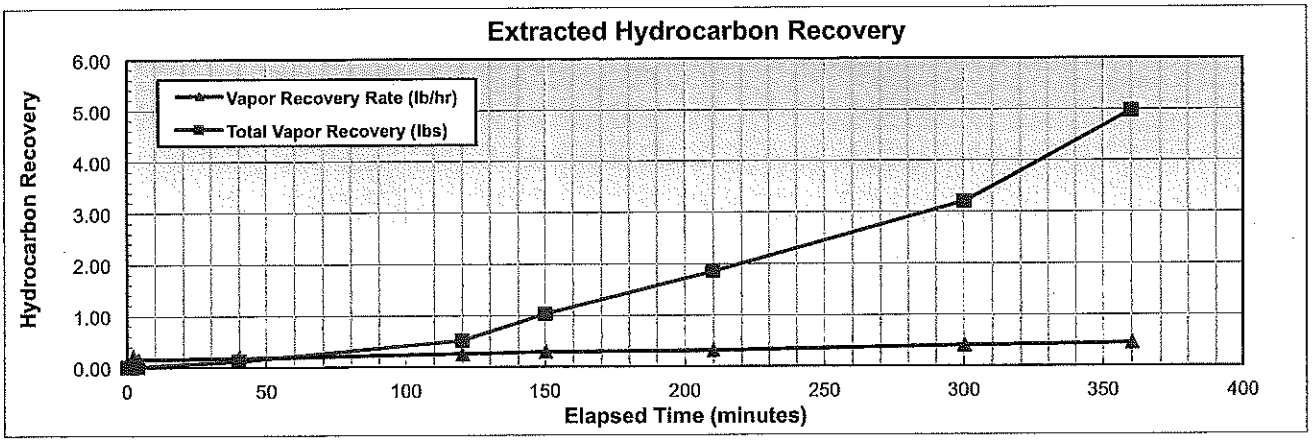
PILOT TEST ANALYSIS WORKSHEETS

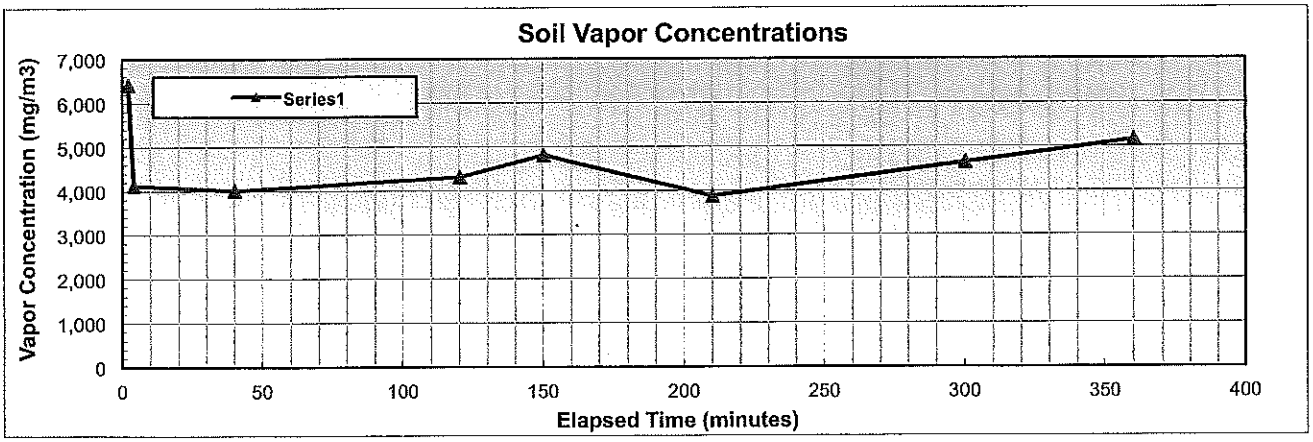
DPE PILOT TEST
VAPOR PHASE AND LNAPL RECOVERY WORKSHEET
FORMOSA PLANT
POINT COMFORT, TX

Test Date: **11-Oct-12**
Test Well: **P57**

Sample Time (min.)	Sample Time (min.)	Analysis Type	Flow (Q) (scfm)	EDC Concentrations		Total Recovery	
				Concentration (mg/m^3)	Emission Rate (lbs/hr)	Per Stage (lbs)	Cumulative (lbs)
Vapor Phase Recovery							
DPE Testing Stage	0	n/a	0.0	0	0.00	0.000	0.000
	2	PID	9.3	6,406	0.22	0.004	0.004
	4	Lab	9.5	4,114	0.15	0.010	0.014
	40	PID	11.6	3,998	0.17	0.106	0.119
	120	PID	15.6	4,308	0.25	0.389	0.508
	150	Lab	16.1	4,803	0.29	0.525	1.033
	210	PID	21.2	3,866	0.31	0.823	1.857
	300	Lab	22.8	4,636	0.40	1.351	3.207
	360	Est.	23.0	5,149	0.44	1.771	4.978
DPE Average Soil Vapor Extraction Rate >>					0.83		

Notes: 1. Analyses indicated as PID were obtained by field screening with a photoionization detector.
2. Estimate (Est.) concentrations were approximated by extrapolation from laboratory or field screening (PID) values.





GAINCO
ENVIRONMENTAL REMEDIATION

Attachment 4
Laboratory Report and Chain of Custody

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ANALYSYS INC.

3512 Montopolis Drive, Austin, TX 78744 &
2209 N. Padre Island Dr., Corpus Christi, TX 78408
(512) 385-5886 • FAX (512) 385-7411

Client: Gainco, Inc.
Attn: Tom Weber
Address: PO Box 309
Portland, TX 78374

Phone: 361-643-4378 **FAX:** 361-777-0971

NELAP ACCREDITED TNI LABORATORY
T104704268-08-TX

Report#/Lab ID#: 535425 **Report Date:** 10/24/12
Project ID: PBW-Formosa
Sample Name: #1
Sample Matrix: gas/bag
Date Received: 10/12/2012 **Time:** 10:45
Date Sampled: 10/11/2012 **Time:** 07:34

REPORT OF ANALYSIS

QUALITY ASSURANCE DATA [1]

Parameter	Result	Units	RQL [5]	Blank	Date/Time Analyzed	Method [6]	Data Qual.[7]	Prec.[2]	Recov.[3]	CCV[4]	LCS [4]
Volatile organics-(TO-15)	---		---		10/24/12	TO-15	---	---	---	---	---
Volatile organics-TPH (8015m)	---		---		10/22/12	8015m	---	---	---	---	---
1,2-Dichloroethane	**985000**	ppbV	100000	<100000	10/24/12 11:53	TO-15	---	-NA-	-NA-	89	97.1
TPH (C4-C10)	**9860**	mg/m3	200	<200	10/22/12 17:32	8015m	N,	22.3	-NA-	86.1	97.1

Respectfully Submitted,

Melanie Poliem

Technical Director (or designee)

1. Quality assurance data for the sample batch which included this sample. 2. Precision (PREC) is the absolute value of the relative percent difference between duplicate results. 3. Recovery (Recov.) is the percent of analyte recovered from a spiked sample. 4. Calibration Verification (CCV) and Laboratory Control Sample (LCS) results are expressed as the percent recovery of analyte. 5. Reporting Quantitation Limits (RQL), typically at or above the Practical Quantitation Limit (PQL) of the analytical method. 6. Method numbers typically denote USEPA procedures. Less than ("<") values reflect nominal quantitation limits adjusted for any required dilutions. 7. Data Qualifiers are J = analyte detected between the RQL and the MDL. B =Analyte detected in associated method blank(s). C=poor CCV recovery. L=poor LCS recovery. S & S1 =MS and/or MSD recovery exceed advisory limits. S2 =Post digestion spike (PDS) recovery exceeds advisory limit. S3 =MS and/or MSD and PDS recoveries exceed advisory limits. P =Precision higher than advisory limit. M =Matrix interference. N=not NELACcertified. N1=subcontract result enquire concerning NELAC certification. Solid sample results for all metals, except Mercury, reported on a dry weght basis (DWB)s. All other results for solid samples reported on an as received basis unless specifically identified as DWB.

Exceptions Report (FINAL SECTION / END-OF-REPORT):

Report #/Lab ID#: 535425 **Matrix:** gas/bag
Client: Gainco, Inc. **Attn:** Tom Weber
Project ID: PBW-Formosa
Sample Name: #1

Unless otherwise identified by data qualifier "N" or by an exception report, all reported results represent parameters and tests for which AnalySys maintains NELAC certification; or results provided by a subcontractor with NELAC certification for the test results provided.

T104704268-08-TX

Sample Temperature/Condition: Ambient

The typical sample temperature criteria (except for metals by ICP, GFAA and AA and a very few other tests) is <= 6°C. Possible exceptions include samples submitted to laboratory within such a short time after sampling that cooling measures used in the field and during transport had insufficient time to achieve desired temperatures in the samples (see sample collection and sample receipt times) and samples where the temperature could not be measured due to sample submission in a manner precluding temperature measurement without impacting sample integrity (ex. in a bottle with no cooler).

Standard sample acceptability conditions met? : YES

Sample received in appropriate container(s), at appropriate temperature and pH.

J flag Discussion:

A J-flag data qualifier indicates that the raw calculated analyte concentration in the sample (uncorrected for background levels/blanks and other potential sources of sampling and analytical contamination), though less than the Reported Quantitation Limit (RQL) is greater than the Detection Limit. Because the reported result is below the quantitation limit for this project/sample (or test procedure), GC/MS organics results may or MAY NOT have been verified as to the presence and relative ratio of target ions (eg. the material causing the J flag "hit" in such situations may be nothing more than background ion-fragment noise.)

Comments pertaining to Data Qualifiers and QC data (where applicable):

Parameter	Qualif.	Comments
TPH (C4-C10)	N	NELAP accreditation for this analyte or this test method (and/or in the indicated matrix) for this analyte not available from TCEQ. 30 TAC§25.6(4) may apply.
TPH (C4-C10)	N	

AnalySys Inc.

3512 Montopolis Drive, Austin, TX 78744 &
2209 N. Padre Island Dr., Corpus Christi, TX 78408
(512) 385-5886 • FAX (512) 385-7411

Client: Gainco, Inc.
Attn: Tom Weber
Address: PO Box 309
Portland, TX 78374

Phone: 361-643-4378 **FAX:** 361-777-0971

NELAP ACCREDITED TNI LABORATORY
T104704268-08-TX

Report#/Lab ID#: 535426 **Report Date:** 10/24/12
Project ID: PBW-Formosa
Sample Name: #2
Sample Matrix: gas/bag
Date Received: 10/12/2012 **Time:** 10:45
Date Sampled: 10/11/2012 **Time:** 10:00

REPORT OF ANALYSIS

QUALITY ASSURANCE DATA [1]

Parameter	Result	Units	RQL [5]	Blank	Date/Time Analyzed	Method [6]	Data Qual.[7]	Prec.[2]	Recov.[3]	CCV[4]	LCS [4]
Volatile organics-(TO-15)	---		---		10/24/12	TO-15	---	---	---	---	---
Volatile organics-TPH (8015m)	---		---		10/22/12	8015m	---	---	---	---	---
1,2-Dichloroethane	**1150000**	ppbV	100000	<100000	10/24/12 10:53	TO-15	---	-NA-	-NA-	89	97.1
TPH (C4-C10)	**4650**	mg/m3	500	<500	10/22/12 17:52	8015m	N,	22.3	-NA-	86.1	97.1

Respectfully Submitted,

Melanie Polier

Technical Director (or designee)

1. Quality assurance data for the sample batch which included this sample. 2. Precision (PREC) is the absolute value of the relative percent difference between duplicate results. 3. Recovery (Recov.) is the percent of analyte recovered from a spiked sample. 4. Calibration Verification (CCV) and Laboratory Control Sample (LCS) results are expressed as the percent recovery of analyte. 5. Reporting Quantitation Limits (RQL), typically at or above the Practical Quantitation Limit (PQL) of the analytical method. 6. Method numbers typically denote USEPA procedures. Less than ("<") values reflect nominal quantitation limits adjusted for any required dilutions. 7. Data Qualifiers are J = analyte detected between the RQL and the MDL. B =Analyte detected in associated method blank(s). C=poor CCV recovery. L=poor LCS recovery. S & S1 =MS and/or MSD recovery exceed advisory limits. S2 =Post digestion spike (PDS) recovery exceeds advisory limit. S3 =MS and/or MSD and PDS recoveries exceed advisory limits. P =Precision higher than advisory limit. M =Matrix interference. N=not NELACcertified. N1=subcontract result enquire concerning NELAC certification. Solid sample results for all metals, except Mercury, reported on a dry weght basis (DWB)s. All other results for solid samples reported on an as received basis unless specifically identified as DWB.

Exceptions Report (FINAL SECTION / END-OF-REPORT):

Report #/Lab ID#: 535426 **Matrix:** gas/bag
Client: Gainco, Inc. **Attn:** Tom Weber
Project ID: PBW-Formosa
Sample Name: #2

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T104704268-08-TX

Sample Temperature/Condition: Ambient

The typical sample temperature criteria (except for metals by ICP, GFAA and AA and a very few other tests) is <= 6°C. Possible exceptions include samples submitted to laboratory within such a short time after sampling that cooling measures used in the field and during transport had insufficient time to achieve desired temperatures in the samples (see sample collection and sample receipt times) and samples where the temperature could not be measured due to sample submission in a manner precluding temperature measurement without impacting sample integrity (ex. in a bottle with no cooler).

Standard sample acceptability conditions met? : YES

Sample received in appropriate container(s), at appropriate temperature and pH.

J flag Discussion:

A J-flag data qualifier indicates that the raw calculated analyte concentration in the sample (uncorrected for background levels/blanks and other potential sources of sampling and analytical contamination), though less than the Reported Quantitation Limit (RQL) is greater than the Detection Limit. Because the reported result is below the quantitation limit for this project/sample (or test procedure), GC/MS organics results may or MAY NOT have been verified as to the presence and relative ratio of target ions (eg. the material causing the J flag "hit" in such situations may be nothing more than background ion-fragment noise.)

Comments pertaining to Data Qualifiers and QC data (where applicable):

Parameter	Qualif.	Comments
TPH (C4-C10)	N	NELAP accreditation for this analyte or this test method (and/or in the indicated matrix) for this analyte not available from TCEQ. 30 TAC§25.6(4) may apply.
TPH (C4-C10)	N	

ANALYSYS INC.

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Attn: Tom Weber
Address: PO Box 309
Portland, TX 78374

Phone: 361-643-4378 **FAX:** 361-777-0971

NELAP ACCREDITED TNI LABORATORY
T104704268-08-TX

Report#/Lab ID#: 535427 **Report Date:** 10/24/12
Project ID: PBW-Formosa
Sample Name: #3
Sample Matrix: gas/bag
Date Received: 10/12/2012 **Time:** 10:45
Date Sampled: 10/11/2012 **Time:** 12:30

REPORT OF ANALYSIS

QUALITY ASSURANCE DATA [1]

Parameter	Result	Units	RQL [5]	Blank	Date/Time Analyzed	Method [6]	Data Qual.[7]	Prec.[2]	Recov.[3]	CCV[4]	LCS [4]
Volatile organics-(TO-15)	---		---		10/24/12	TO-15	---	---	---	---	---
Volatile organics-TPH (8015m)	---		---		10/23/12	8015m	---	---	---	---	---
1,2-Dichloroethane	**1110000**	ppbV	100000	<100000	10/24/12 09:53	TO-15	---	-NA-	-NA-	89	97.1
TPH (C4-C10)	**2400**	mg/m3	100	<100	10/23/12 07:44	8015m	N,	22.3	-NA-	86.1	97.1

Respectfully Submitted,

Melanie Polier

Technical Director (or designee)

1. Quality assurance data for the sample batch which included this sample. 2. Precision (PREC) is the absolute value of the relative percent difference between duplicate results. 3. Recovery (Recov.) is the percent of analyte recovered from a spiked sample. 4. Calibration Verification (CCV) and Laboratory Control Sample (LCS) results are expressed as the percent recovery of analyte. 5. Reporting Quantitation Limits (RQL), typically at or above the Practical Quantitation Limit (PQL) of the analytical method. 6. Method numbers typically denote USEPA procedures. Less than ("<") values reflect nominal quantitation limits adjusted for any required dilutions. 7. Data Qualifiers are J = analyte detected between the RQL and the MDL. B =Analyte detected in associated method blank(s). C=poor CCV recovery. L=poor LCS recovery. S & S1 =MS and/or MSD recovery exceed advisory limits. S2 =Post digestion spike (PDS) recovery exceeds advisory limit. S3 =MS and/or MSD and PDS recoveries exceed advisory limits. P =Precision higher than advisory limit. M =Matrix interference. N=not NELACcertified. N1=subcontract result enquire concerning NELAC certification. Solid sample results for all metals, except Mercury, reported on a dry weght basis (DWB)s. All other results for solid samples reported on an as received basis unless specifically identified as DWB.

Exceptions Report (FINAL SECTION / END-OF-REPORT):

Report #/Lab ID#: 535427 **Matrix:** gas/bag
Client: Gainco, Inc. **Attn:** Tom Weber
Project ID: PBW-Formosa
Sample Name: #3

Unless otherwise identified by data qualifier "N" or by an exception report, all reported results represent parameters and tests for which AnalySys maintains NELAC certification; or results provided by a subcontractor with NELAC certification for the test results provided.

T104704268-08-TX

Sample Temperature/Condition: Ambient

The typical sample temperature criteria (except for metals by ICP, GFAA and AA and a very few other tests) is <= 6°C. Possible exceptions include samples submitted to laboratory within such a short time after sampling that cooling measures used in the field and during transport had insufficient time to achieve desired temperatures in the samples (see sample collection and sample receipt times) and samples where the temperature could not be measured due to sample submission in a manner precluding temperature measurement without impacting sample integrity (ex. in a bottle with no cooler).

Standard sample acceptability conditions met? : YES

Sample received in appropriate container(s), at appropriate temperature and pH.

J flag Discussion:

A J-flag data qualifier indicates that the raw calculated analyte concentration in the sample (uncorrected for background levels/blanks and other potential sources of sampling and analytical contamination), though less than the Reported Quantitation Limit (RQL) is greater than the Detection Limit. Because the reported result is below the quantitation limit for this project/sample (or test procedure), GC/MS organics results may or MAY NOT have been verified as to the presence and relative ratio of target ions (eg. the material causing the J flag "hit" in such situations may be nothing more than background ion-fragment noise.)

Comments pertaining to Data Qualifiers and QC data (where applicable):

Parameter	Qualif.	Comments
TPH (C4-C10)	N	NELAP accreditation for this analyte or this test method (and/or in the indicated matrix) for this analyte not available from TCEQ. 30 TAC§25.6(4) may apply.
TPH (C4-C10)	N	

CHAIN-OF-CUSTODY

www.analysysinc.com

ANALYSYS INC.

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2209 N. Padre Island Drive, Suite K
Corpus Christi, TX 78408
Ph (361) 289-6384 • Fax (361) 289-0875

Send Reports To:

Company Name: Gainco, Inc.
Address: P.O. Box 309
City: Portland State: Zip:
ATTN: Tom Weber
Phone: 210-669-8941 Fax: 866-306-0436
Project Name/PO#: PBW-Formosa Sampler: Stas Grover

Bill To (if different):

Company Name: Same
Address:
City: State: Zip:
ATTN:
Phone: Fax:

Samples/projects intended for TCEQ-TRRP completion require special handling, QC requirements and pricing. To Be successfully completed such projects should be identified and discussed prior to receipt and **MUST BE IDENTIFIED** on this Chain-of-Custody under "special instructions".

Client Sample No. Description/Identification	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Lab I.D. # (Lab Only)	No. of Containers and Preservative (TRRP-13 Mandatory): Ice	HNO3	HCL	ZnAc/NaOH	H2SO4	Glass	None	Other (Specify)	Matrix: Water	Wastewater	Waste	Soil	Other (Specify) Air	TRRP	Analyze For: EDC	TPH	RUSH TAT (Pre-Scheduled)	Standard TAT
#1	10/11/12	7:34	1	✓		535425							✓						✓		✓	✓		
#2	"	10:00	1	"		535426							"						"		"	"		
#3	"	12:30	1	"		535427							"						"		"	"		

Special Instructions (such as special QC requirements, lists, methods, etc...)

Please email result to Tom Weber at tweber@gaincoinc.com
Any questions Please call Tom Weber @ 210-669-8941

(1)Unless specifically requested otherwise on this Chain-of-custody and/or attached documentation, all analyses will be conducted using ASI's method of choice and all data will be reported to ASI's normal reporting limits (MDL/PQL). For GC/MS volatiles and extractables, unless specific analytical parameter lists are specified on this chain-of-custody or attached to this chain-of-custody, ASI will default to Priority Pollutants or ASI's HSL list at ASI's option. Specific compound lists must be supplied for all GC procedures.

Temperature upon receipt (Consistent with NELAC sec. 5.11) (>0-6°C): 1.9 / 7.3

Sample Relinquished By				Sample Received By				
Name	Affiliation	Date	Time	Name	Affiliation	Date	Time	
Stas Grover	Gainco	10/12/12	10:45	[signature]	ASI	10/12/12	1045	YES / NO

[Tendering of above described samples to AnalySys, Inc. for analytical testing constitutes agreement by buyer/sampler to AnalySys, Inc.'s standard terms.]

F0028
Revised by: ML

9/20/12
Page 1 of 1

ASI Lab ID #'s: 535425-427 SAMPLE CHECK-IN

Samples delivered by: ☑ Client ☑ Bus ☐ LSO ☐ UPS ☐ Fed-Ex ☐ ASI/PU ☐ Courier ☐ Other

Samples Checked-in by:

Houston	Date	T: Obs/Corr	~~Corpus~~	Date	T: Obs/Corr	Austin	Date	T: Obs/Corr
		°C	GR	10/12/12	AM 13 °C	MZ	10/13/12	AM6 °C
☐ T Blank		T#:	☐ T Blank		T#: NA	☐ T Blank	NA	T#: NA

COC Entry Line	1 pH	2 pH	3 pH	4 pH	5 pH	6 pH	7 pH	8 pH	9 pH	10 pH
a. 4 oz soil jar										
b. 8 oz soil jar										
c. 16 oz soil jar										
d. 32 oz soil jar										
e. 40 mL VOA vials (unpres)										
f. 40 mL VOA vials (HCl)										
g. 120 mL amber (unpres)										
h. 120 mL amber (H2SO4)										
i. 250 mL amber (H2SO4)										
j. 500 mL amber (unpres)										
k. 500 mL amber (H2SO4)										
l. 950 mL amber (unpres)										
m. 8 oz HDPE (unpres)										
n. 8 oz Nalgene (HNO3)										
o. 16 oz HDPE (unpres)										
p. 16 oz Nalgene (HNO3)										
q. 16 oz HDPE (ZnAc/NaOH)										
r. 32 oz HDPE (unpres)										
s. 32 oz Nalgene (HNO3)										
t. 32 oz HDPE (Ascorbic acid)										
u. Tedlar bag/SUMA canister	1	1	1							
v. Sterile Bottle										
w. Other										
Splits to Austin	V	V	V							
Splits to Corpus Christi										
Splits to Subcontract Lab(s)										

☐ RUSH _____ Date Due

F-0029- Rev. 3 Pg. 1
Prepared: 08/19/2011
Effective: 09/18/2012

ASI Sample Evaluation and Comment Tracking

Sample #'s: 535425-427 **Client:** Gainco **Date:** 10/13/12 **Proj. Name:** PBW-Formosa **# of C-O-C's:** 1

In compliance with the NELAC standard, ASI is notifying you that the **SAMPLES** identified here and on the attached Chain-of-Custody were received by AnalySys, Inc. (ASI) with the followin **INTEGRITY ISSUES** (any NO responses indicated below). In order to assure that ASI will meet your testing needs in a timely manner, **ASI WILL PROCEED WITH THE TESTING** of thes samples as directed and comment on the final reports per NELAC requirements. **PLEASE NOTIFY ASI IMMEDIATELY** if you wish to **SUSPEND** analysis, **MAKE ANY CHANGES** to th requested testing services or if the action indicated **IS INCORRECT.**

Sample Integrity Evaluation on Receipt

Item	Y	N	N/A		Item	Y	N	N/A	
1	✓			C-O-C Received w/samples?	9			✓	Dissolved metal samples field filtered and preserved?
2	✓			C-O-C complete with adequate info?	10			✓	Special Compound VOAs for water not required or provided?
3	✓			C-O-C and samples match (# and descrip.)?					(See Attached for Volatiles acceptance criteria)
4	✓			Custody Seals (if present) intact?	11	✓			Other sample preservation OK?
5	✓			Sample Integrity OK?	12	✓			Other Sample Containers Appropriate?
6	✓			Sample Preservation-Temp OK?	13			✓	VOA headspace OK?
7			✓	Samples received on ice or from client refrigerator?	14			✓	Client Indicated NO bulk soil/solid samples for volatile analysis?
8			✓	Receipt criteria following intra-lab transfer is consistent with original receipt?	15			✓	Client Indicated NO bulk soil/solid samples for TPH-1005 analysis?

Comment: _____

☐ ASI Personnel assisted with completion of the C-O-C (in-person or by phone/e-mail).
☐ Additional information supplied w/C-O-C by client.
☐ Samples submitted significantly after (>2 days) sampling, potentially affecting ability to meet holding times.

Comment: _____

Project Management Observations or Discrepancies

☐ Insufficient information supplied to determine target analytes required. ASI standard lists will be used.
☐ Special report formats **REQUIRED.** ☐ TRRP ☐ Landfill ☐ Other
☐ Historical project data available for review.
☐ Target analyte list attached.

Comment: _____

Form Sent to Client on: _____ at _____ by ☐ FAX ☐ E-Mail ☐ mail
Client Response Recd.: _____ at _____ by ☐ FAX ☐ E-Mail ☐ VERBAL

Client Response: ☐ Proceed w/analysis ☐ Resample and re-submit _____

Authorized by (Client Signature): _____ **Date** _____